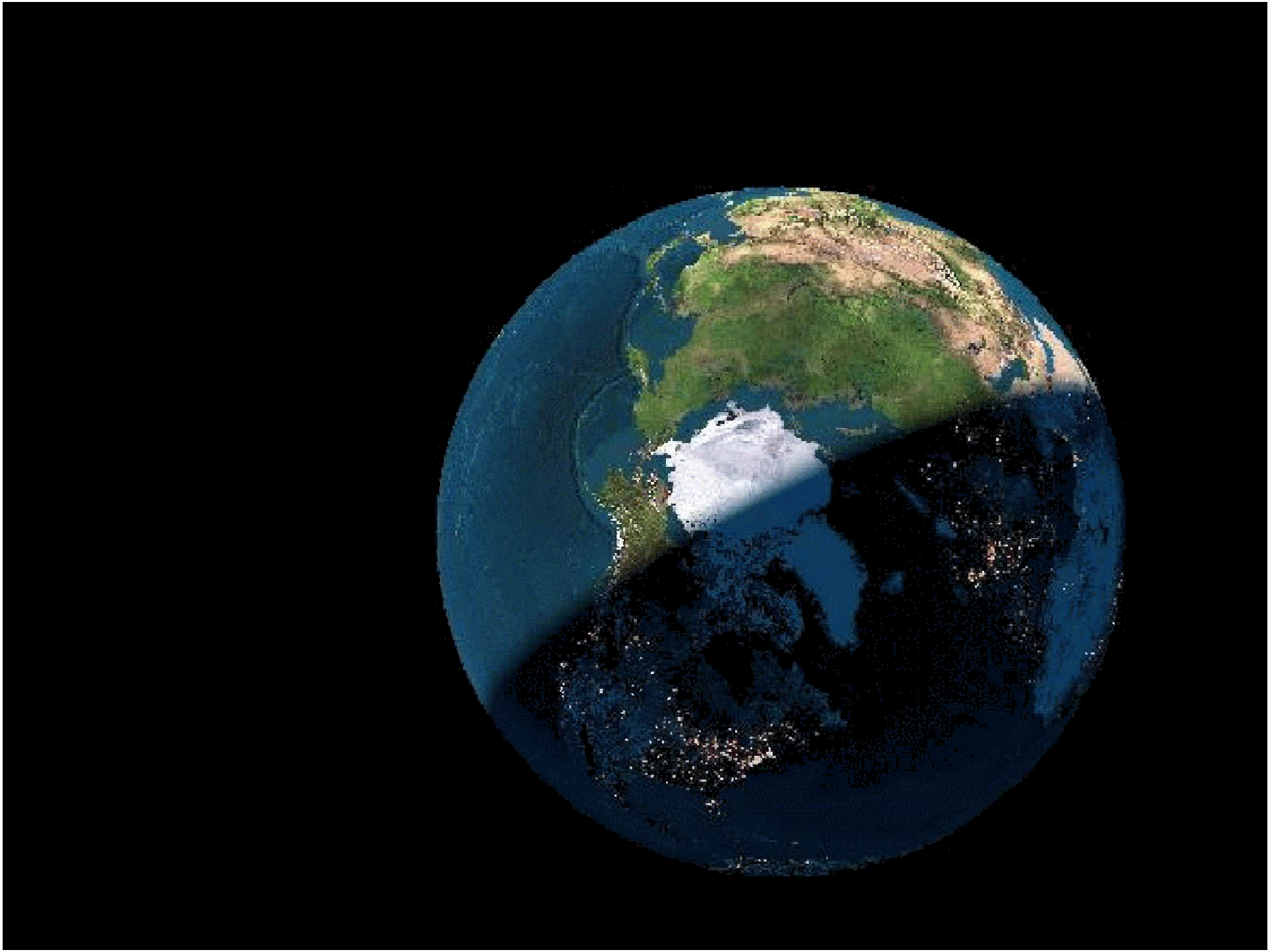
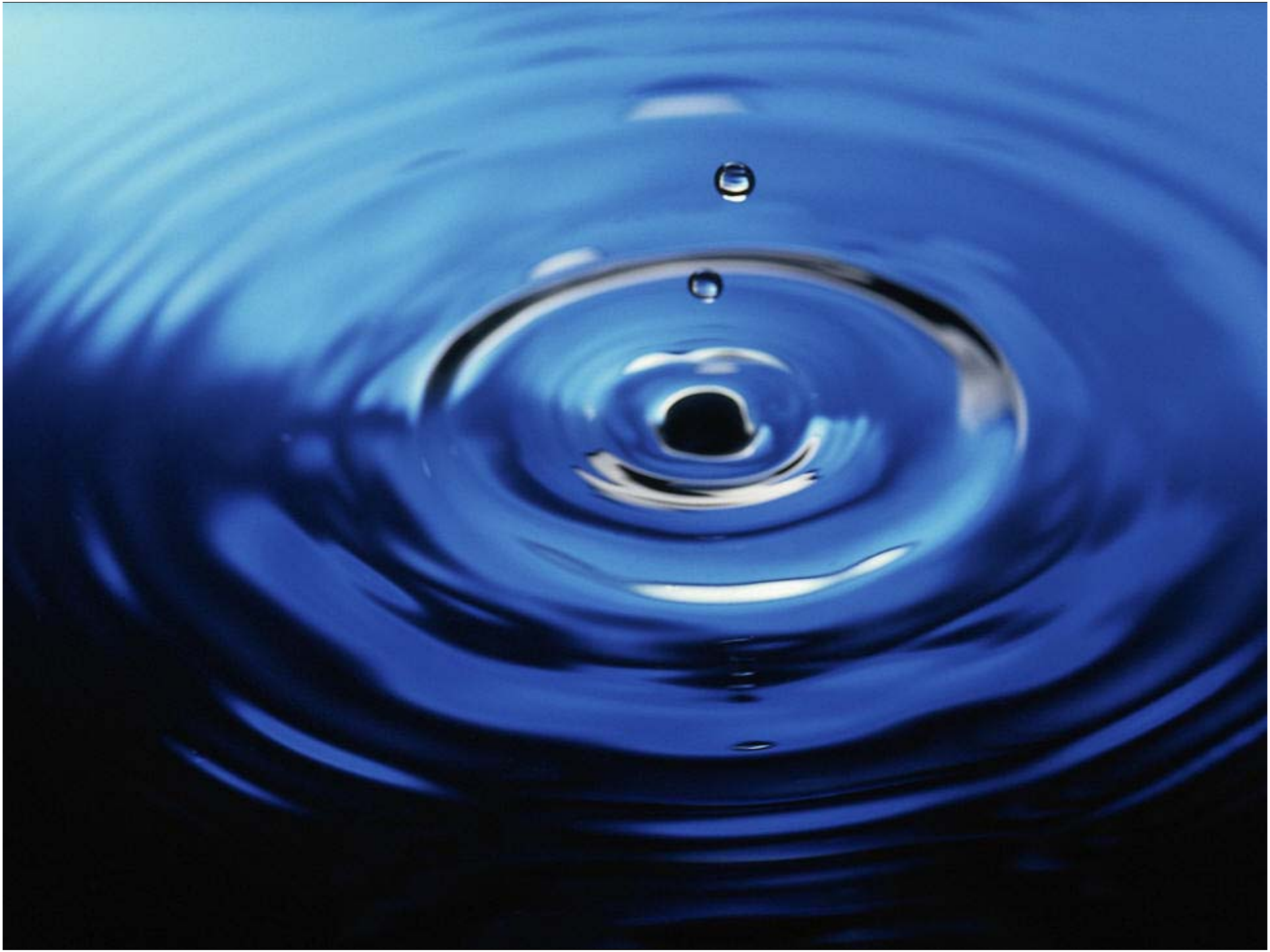
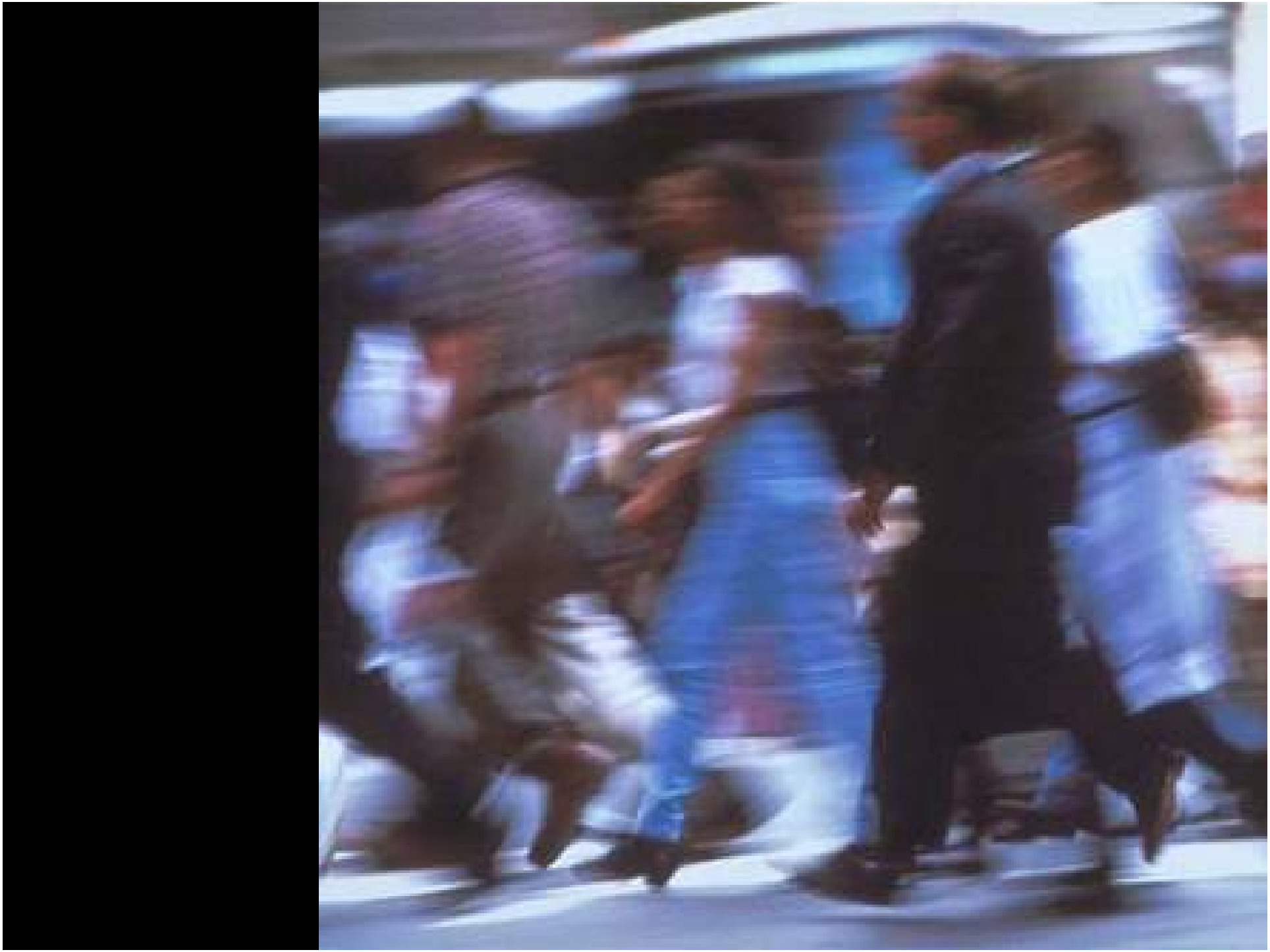
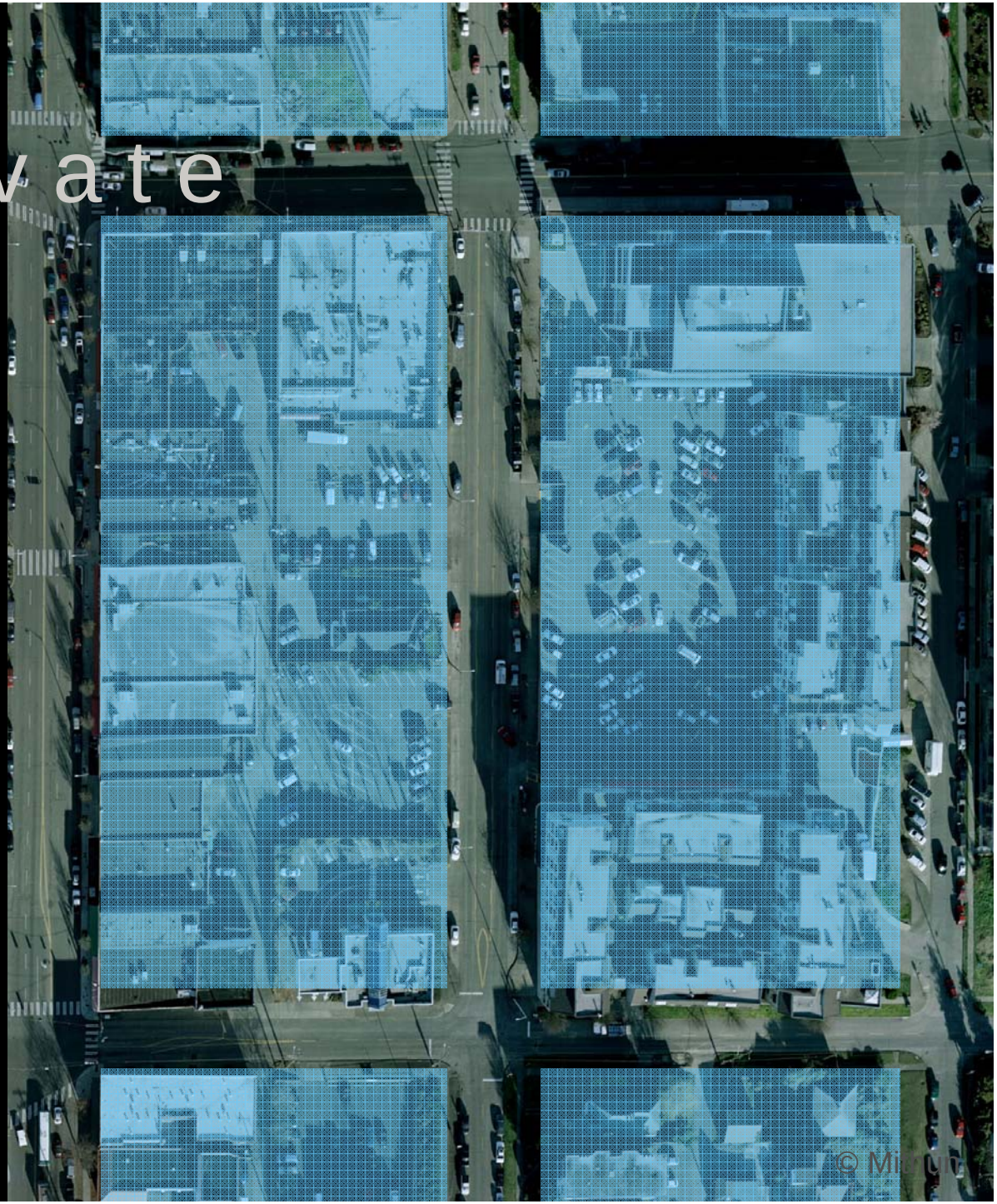






private

MITHŪN



MITHŪN

Resource Guide for Sustainable Development

in an urban environment

a Case Study
in South Lake Union
Seattle, Washington

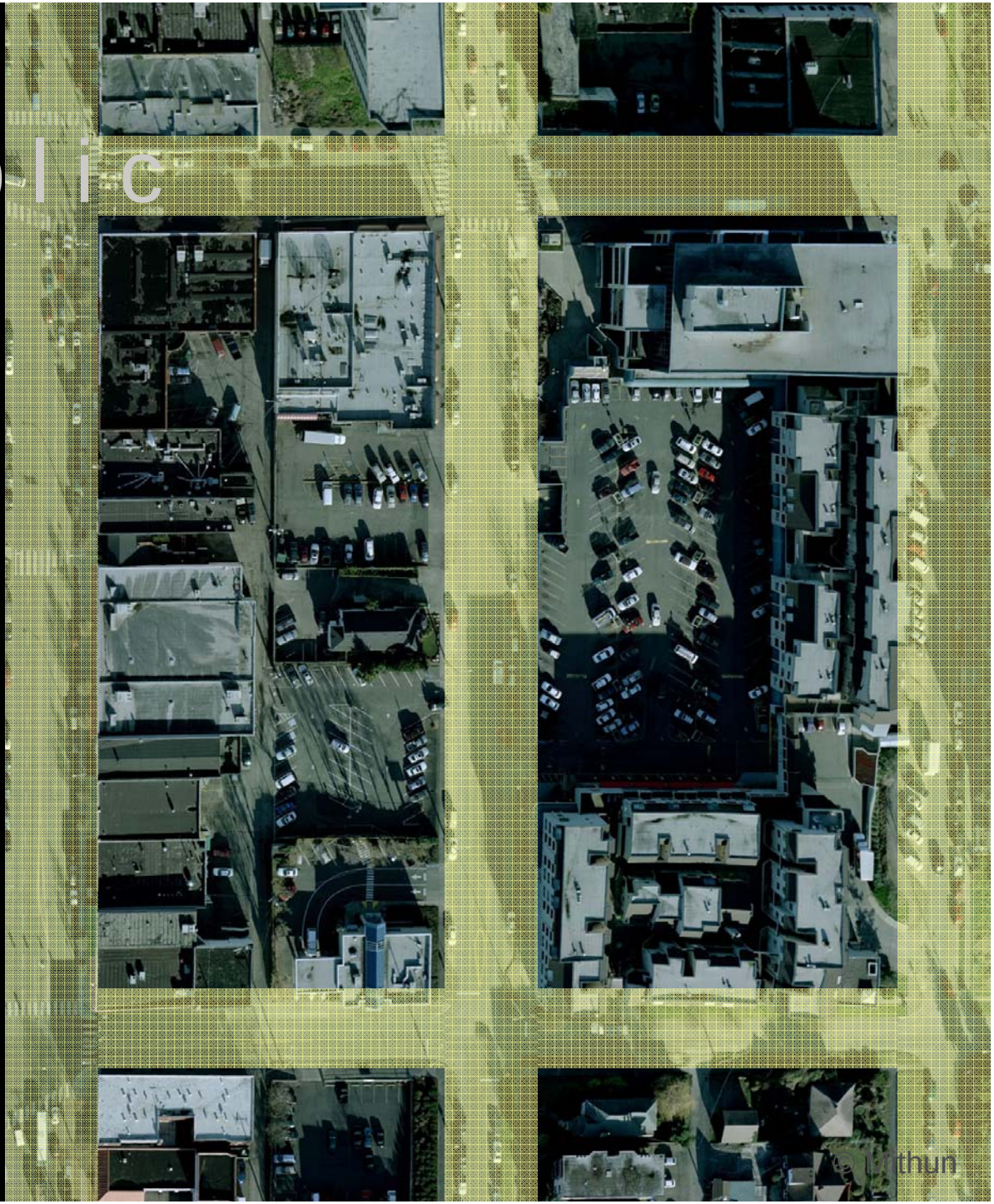
oct 22, 2002 v1.0

VULCAN
sponsored by

prepared by

public

MITHŪN



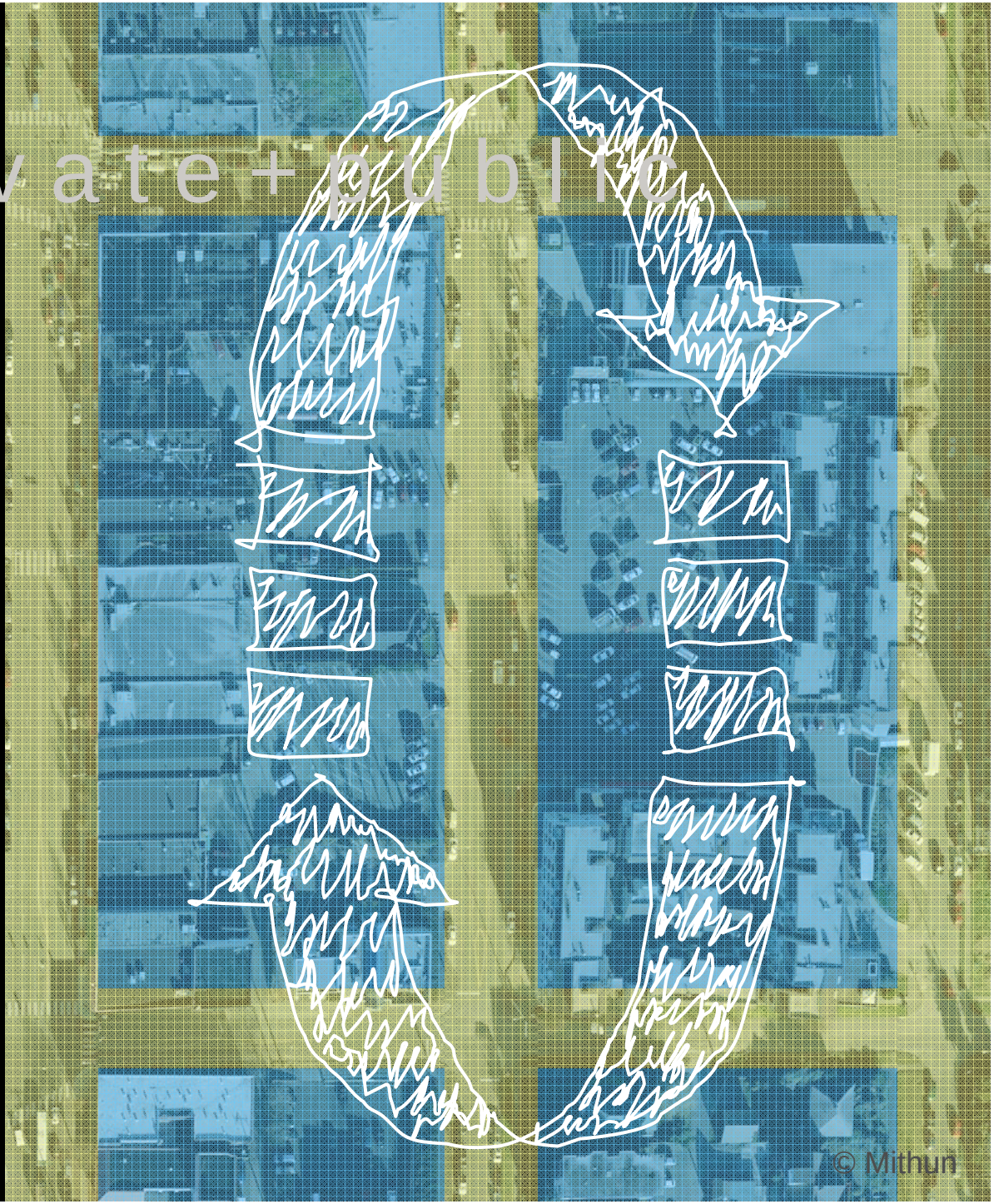
The Blue Ring

connecting places

Seattle's Open Space Strategy
For the Center City

private+public

MITHŪN



MITHŪN

LLOYD CROSSING

Sustainable Urban Design Plan & Catalyst Project

Portland, Oregon

July 1, 2004

lloyd crossing

sustainable context

MITHŪN

lloyd crossing

sustainable urban design

PDC
PORTLAND DEVELOPMENT COMMISSION

Sustainable Urban Design Plan:

Identify "green" infrastructure opportunities and synergies that can be realized at the neighborhood scale

Lloyd Crossing Signature Project:

Develop a conceptual design for a sustainable, financially feasible, mixed-use development project that will catalyze future private development in the district

lloyd crossing

sustainable urban design plan

team:

mithun
heartland
solarc
kpff
greenworks
urbsworks
interface
walsh construction
id

MITHŪN

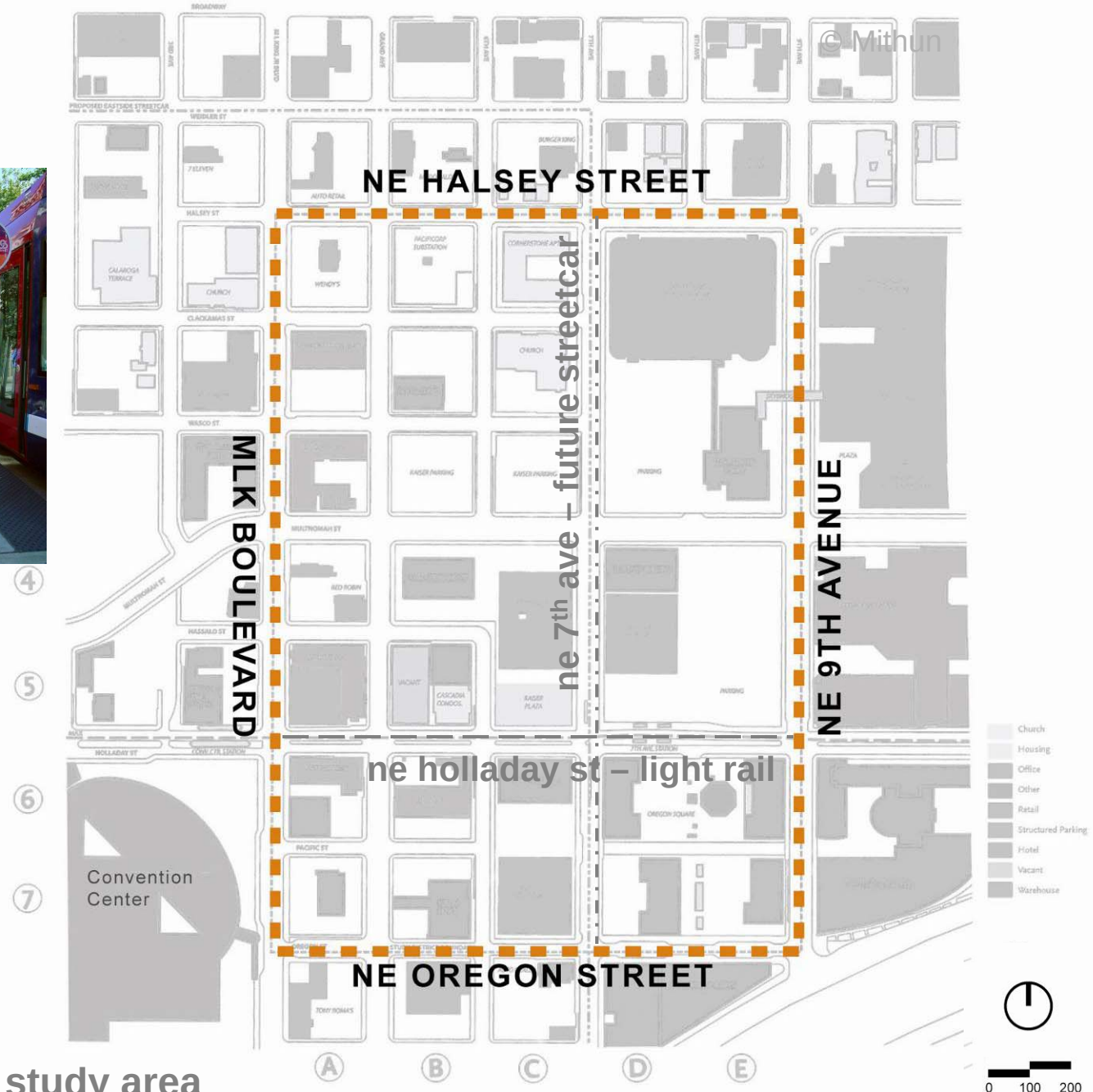
lloyd crossing

sustainable urban design plan

MITHŪN

district map

MITHŪN



study area

MITHŪN

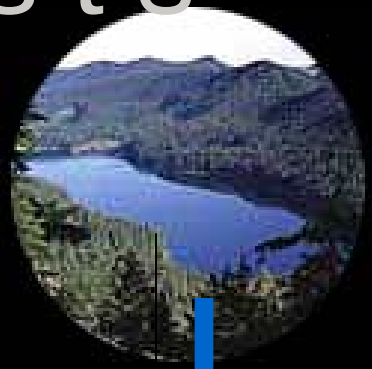

VOLVO
240 GL


LEFT LANE
MUST
TURN LEFT


PACIFICORP
CH2MHILL
KeyBank

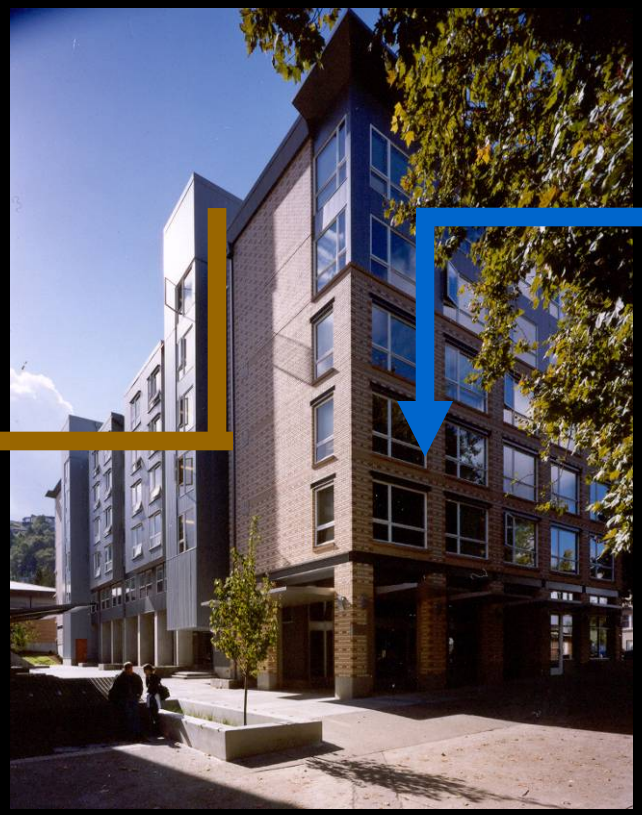
resource costs

portland water



0.6 cents/gallon

To Columbia Boulevard Wastewater Treatment Plant



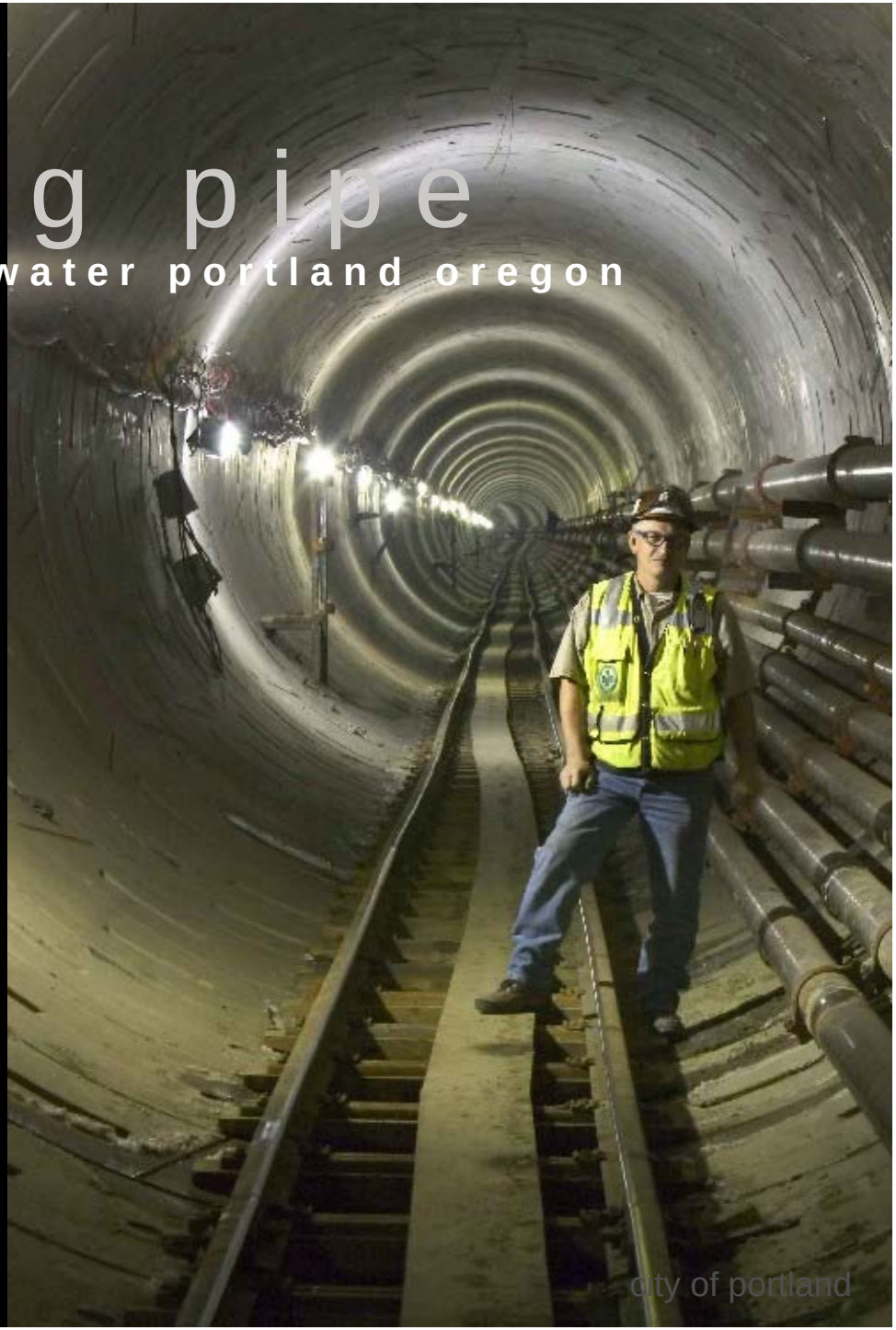
From Bull Run Watershed

0.3 cents/gallon

the big pipe

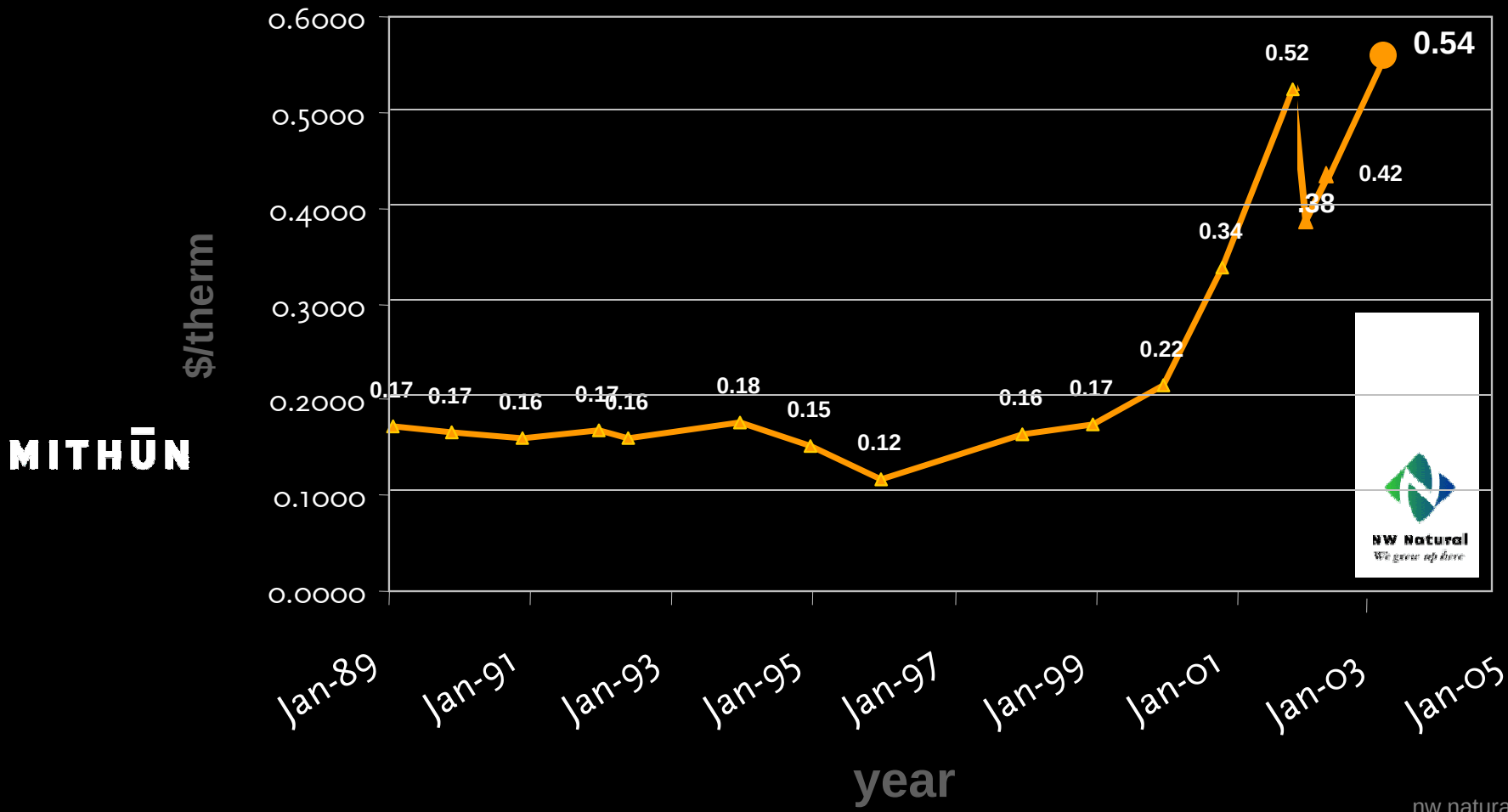
stormwater portland oregon

MITHŪN



resource costs

portland natural gas

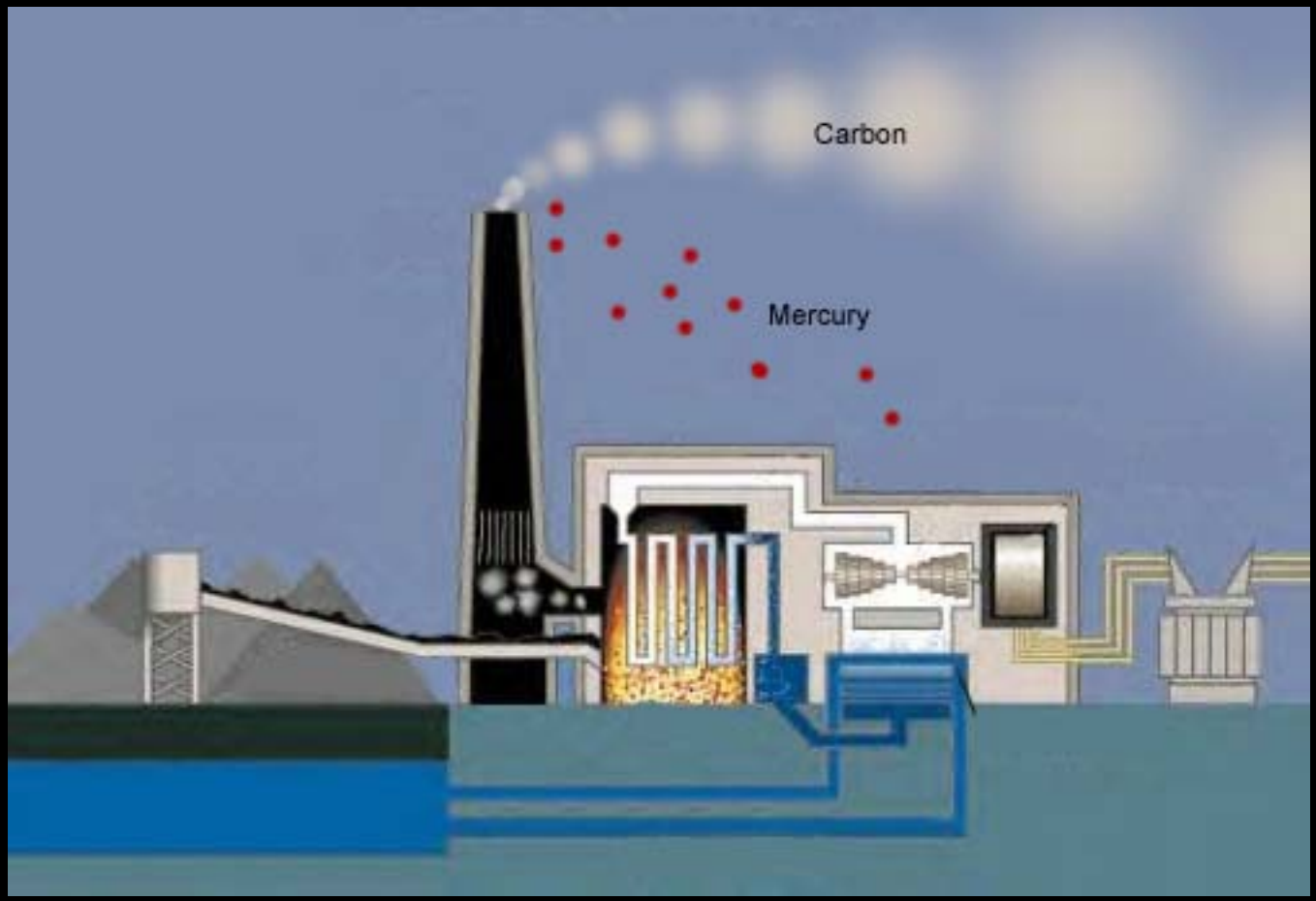


MITHŪN

nw natural

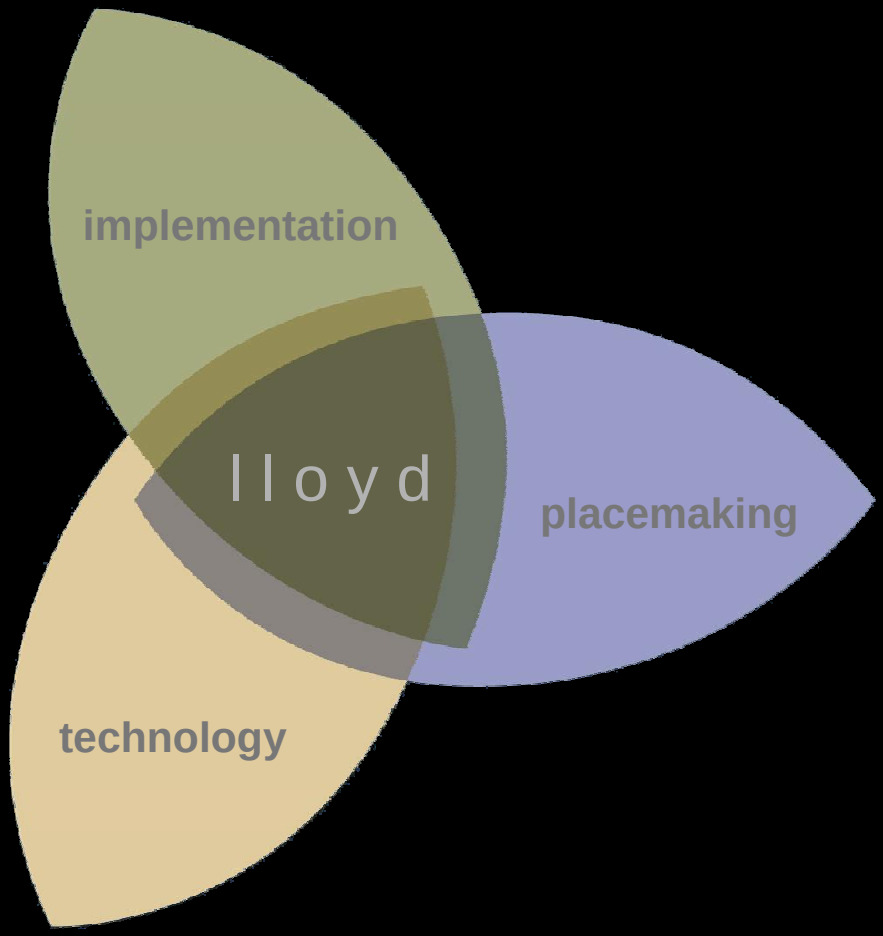
coal power

MITHŪN



sustainable

urban design plan



MITHŪN

goals

2001 development strategy

mobility

activity

livability

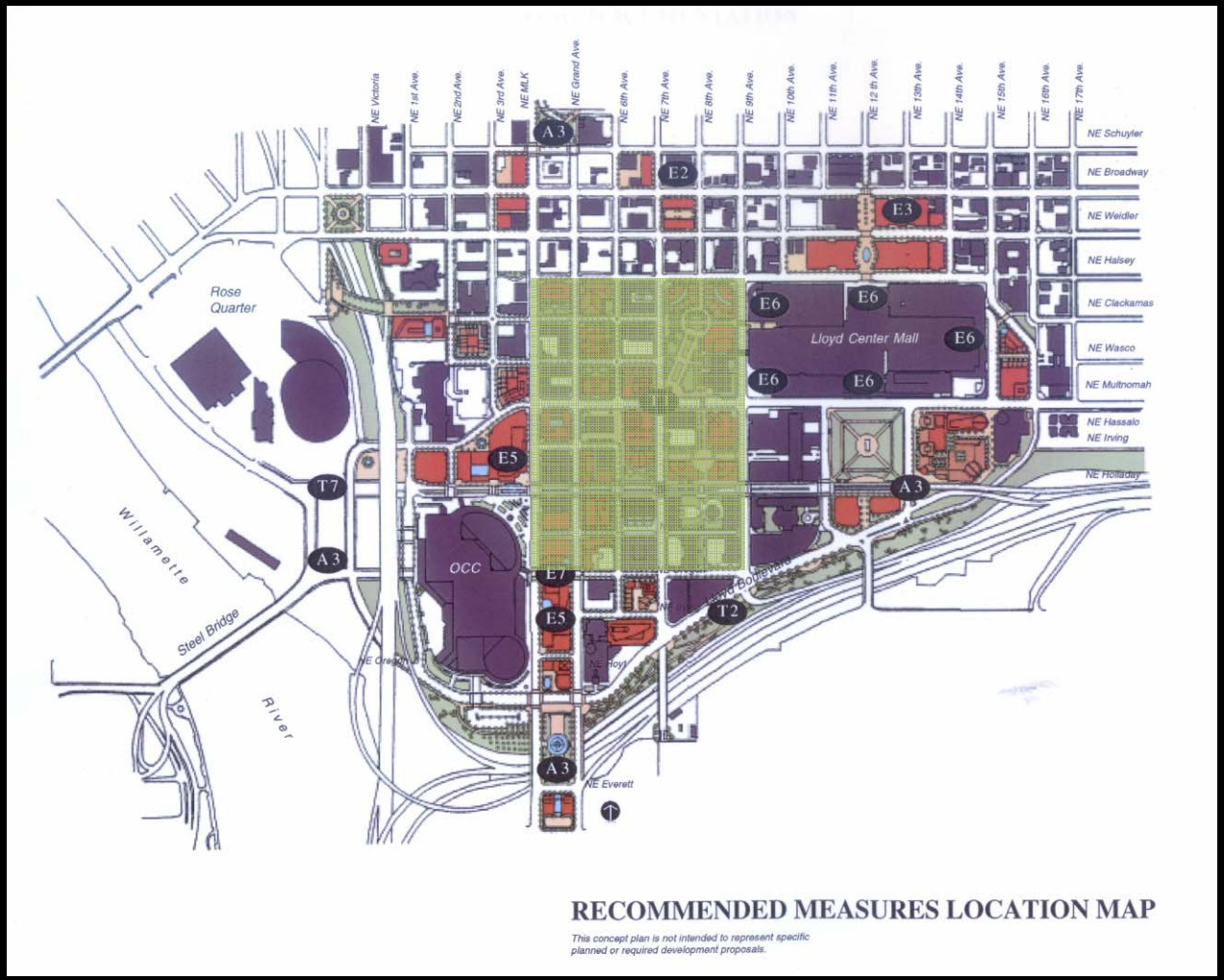
identity

MITHŪN

goals

2001 development strategy

MITHŪN



RECOMMENDED MEASURES LOCATION MAP

This concept plan is not intended to represent specific planned or required development proposals.

goals

2004 sustainable urban design plan

mobility

vision

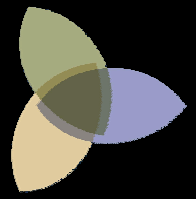
activity

livability

identity

sustainability

MITHŪN



dynamic mix of uses
high density
enhance identity
optimize shared systems
enhance linkages
achievable

predevelopment

metrlcs

vision

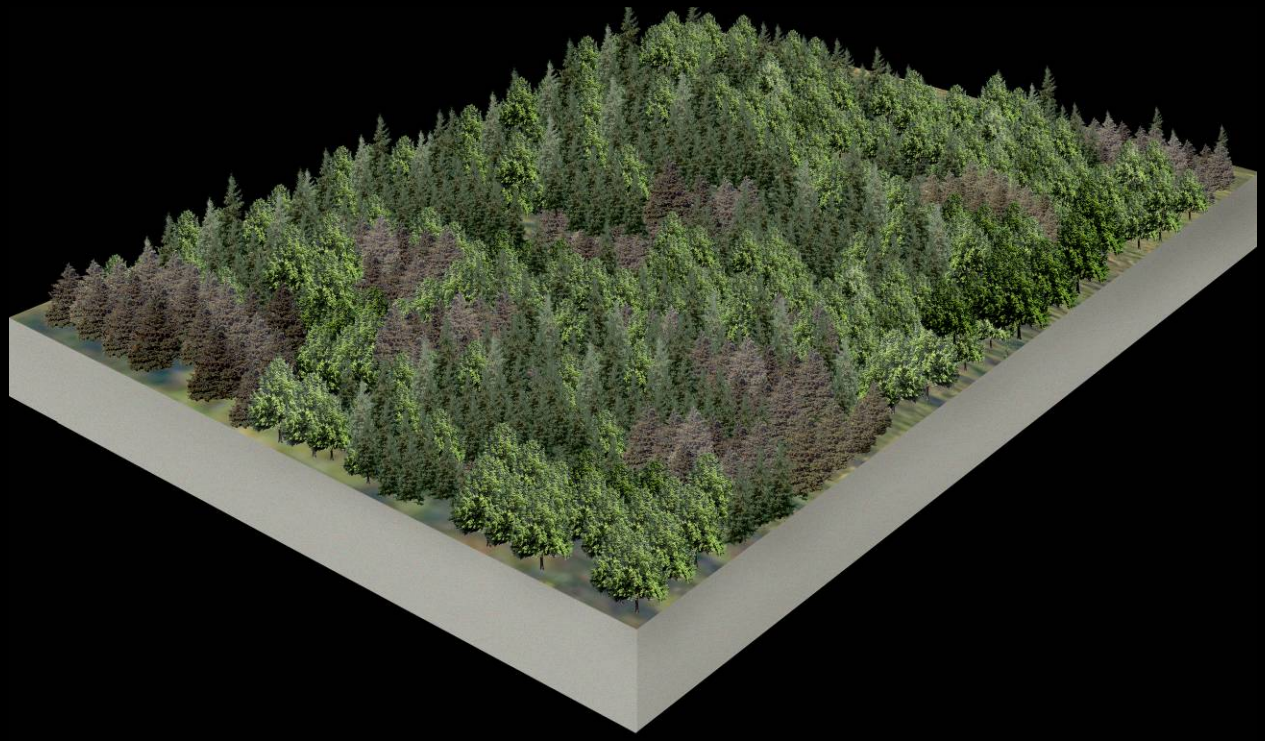
a predevelopment

metrics goal

lloyd study area

MITHŪN

MITHŪN

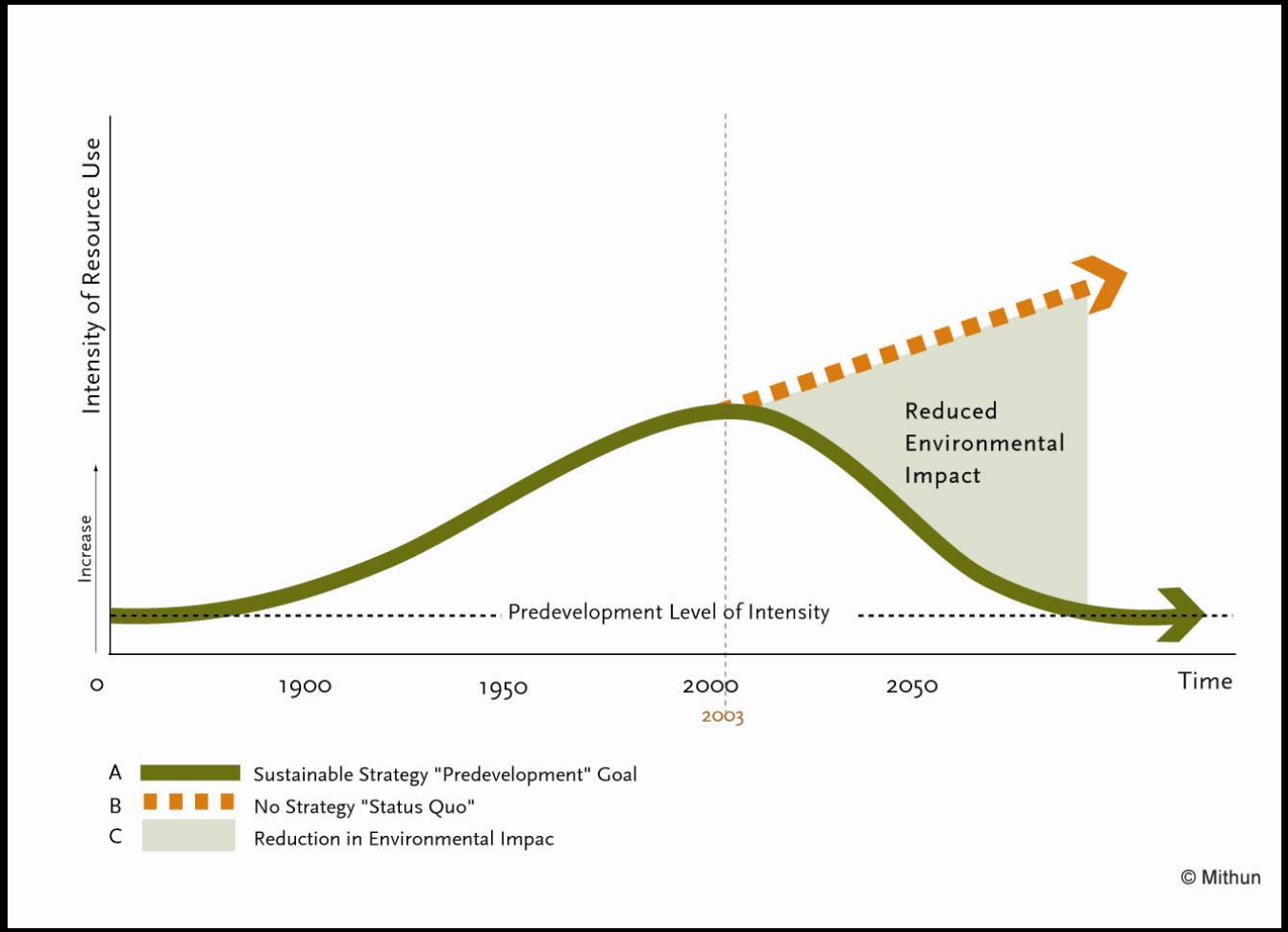


Predevelopment

predevelopment

metrics

MITHŪN



predevelopment

metrics

metrics

solar energy
water
carbon
habitat
materials

development

urban growth boundary metrlcs

vision

utilize all

available FAR

within study area

MITHŪN

water use

water neutral

vision

a water

neutral

lloyd study area

MITHŪN

energy

carbon neutral

vision

a carbon

MITHŪN

neutral

lloyd study area

energy

total energy

vision

live within the study area annual solar budget

MITHŪN

habitat

landscape & habitat

vision

predevelopment

habitat metrics

through on & off site

strategies

MITHŪN

materials use

carbon neutral

vision

a materials

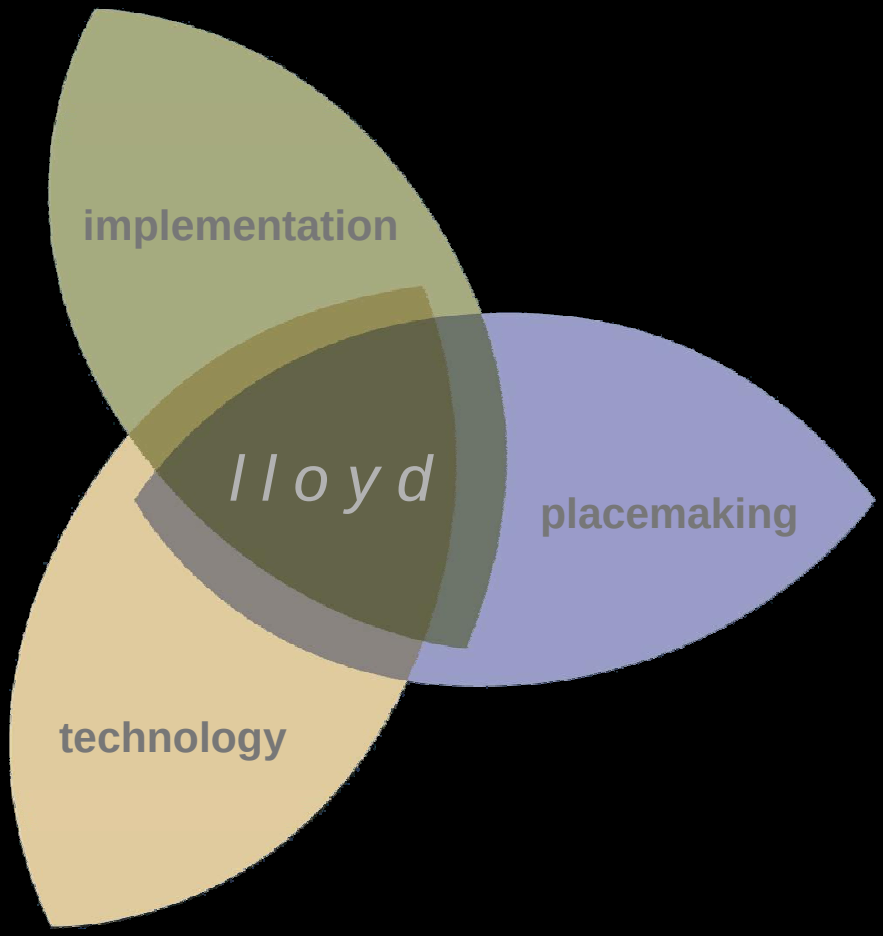
carbon neutral

lloyd study area

MITHŪN

placemaking

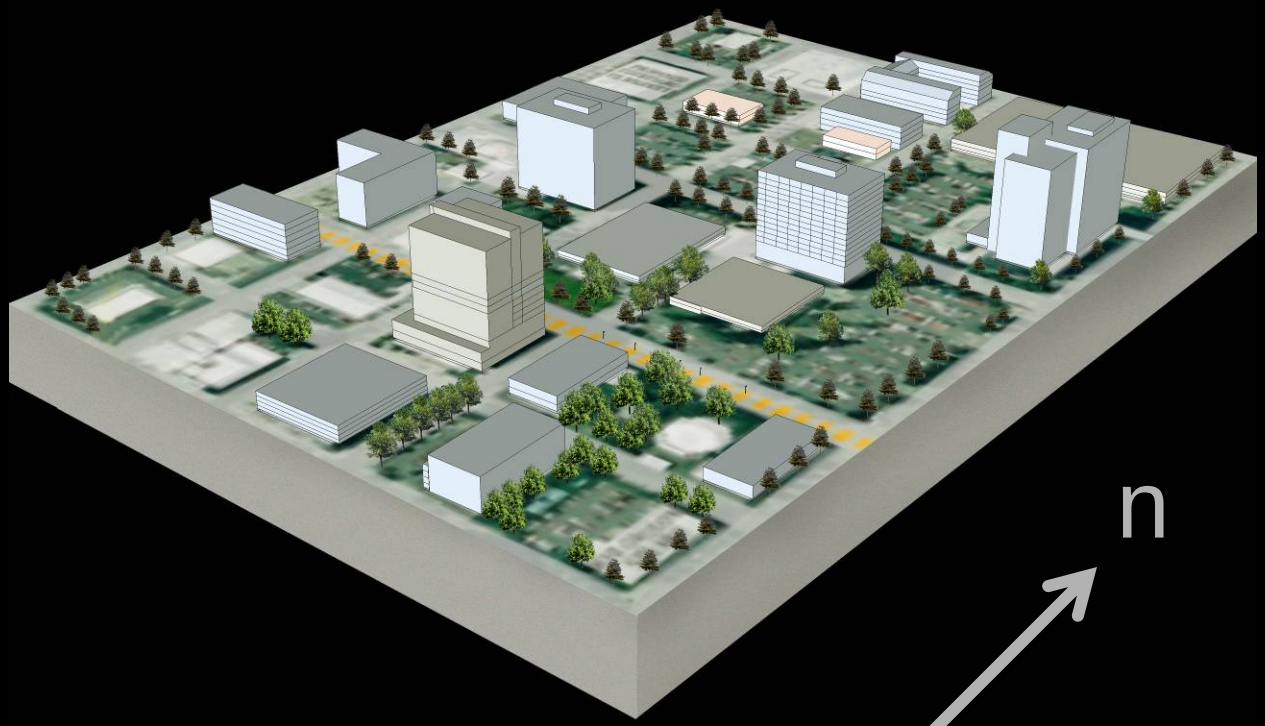
sustainable urban design plan



MITHŪN

2004 existing

2004 metrics



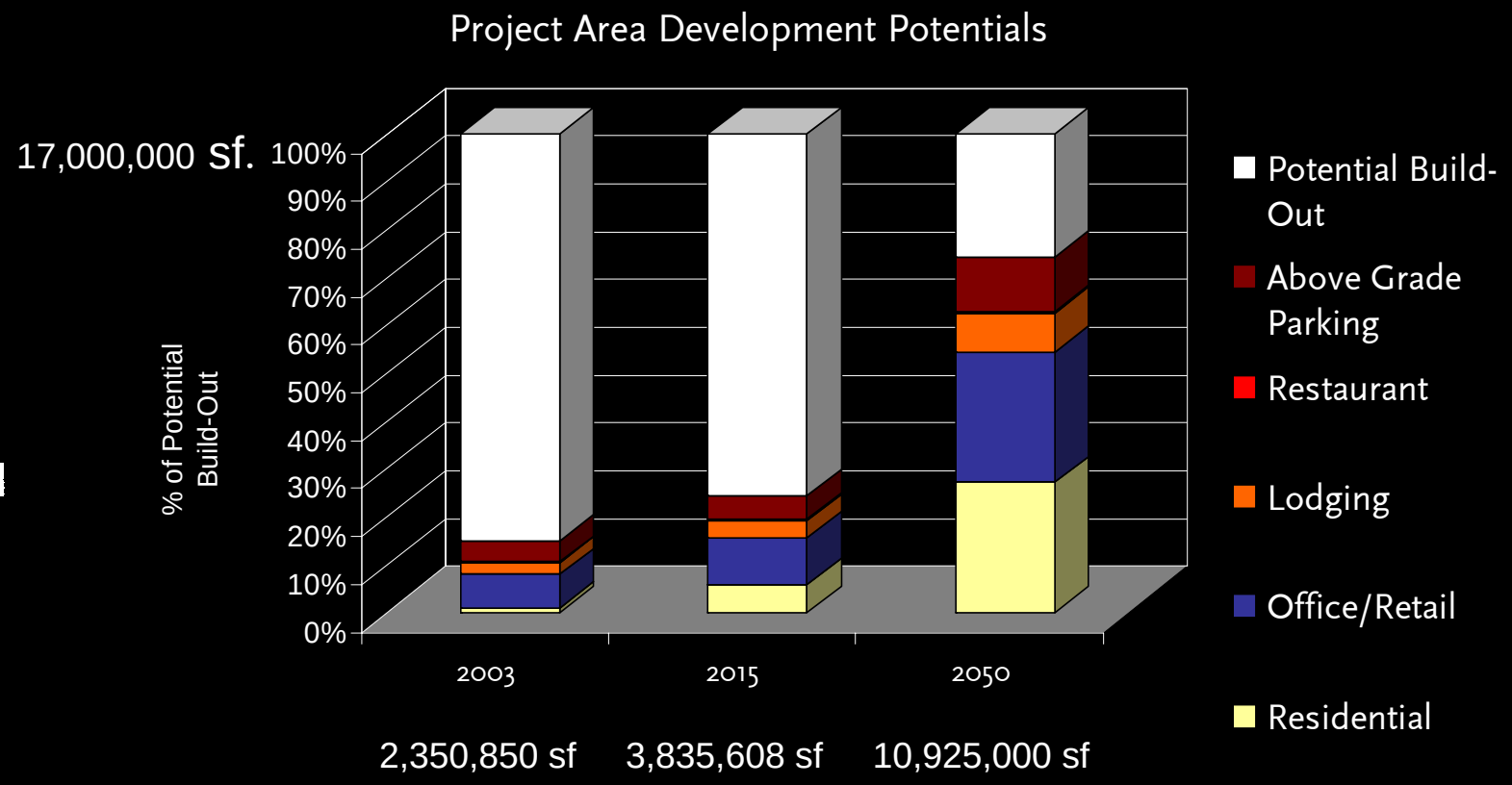
MITHŪN

n

2004 Existing

development

development potentials

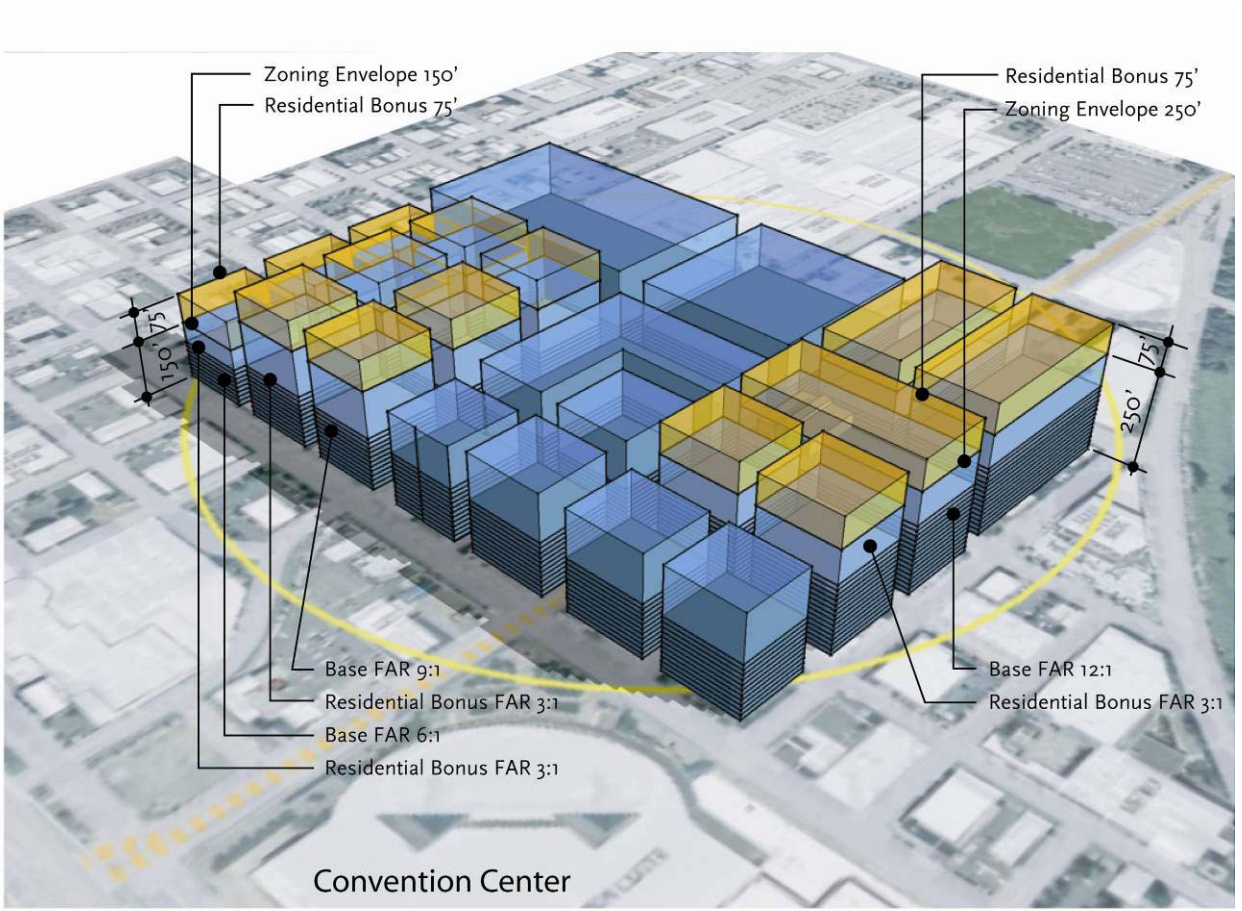


MITHŪN

development

development potentials

MITHŪN



placemaking

street hierarchy

MITHŪN

placemaking

preferred ground level use

MITHŪN

placemaking

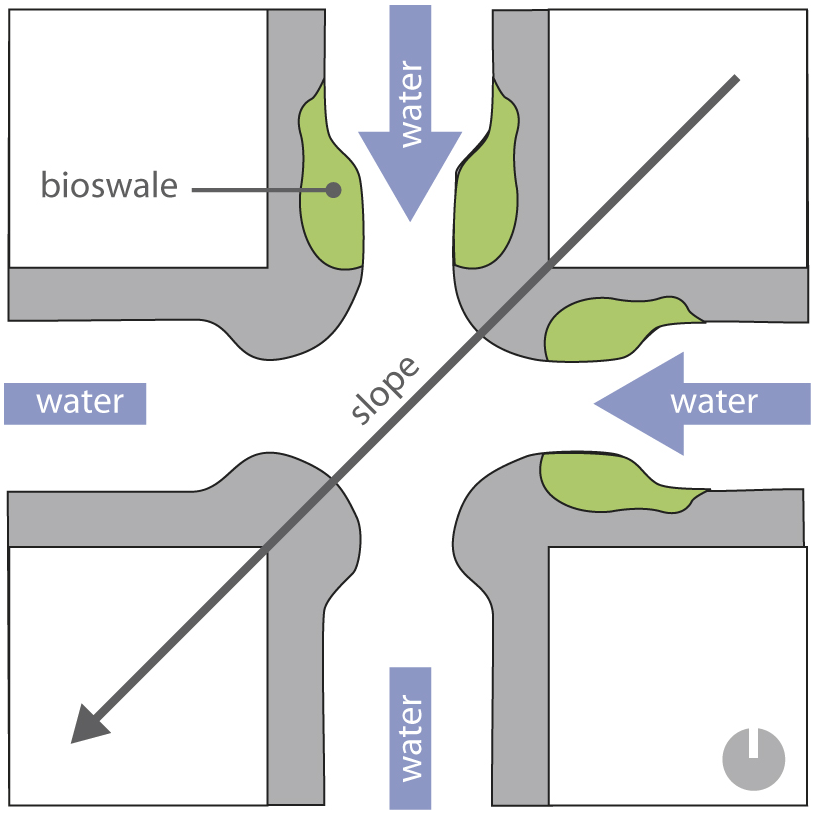
preferred upper level use

MITHŪN

placemaking

distributed green water swale

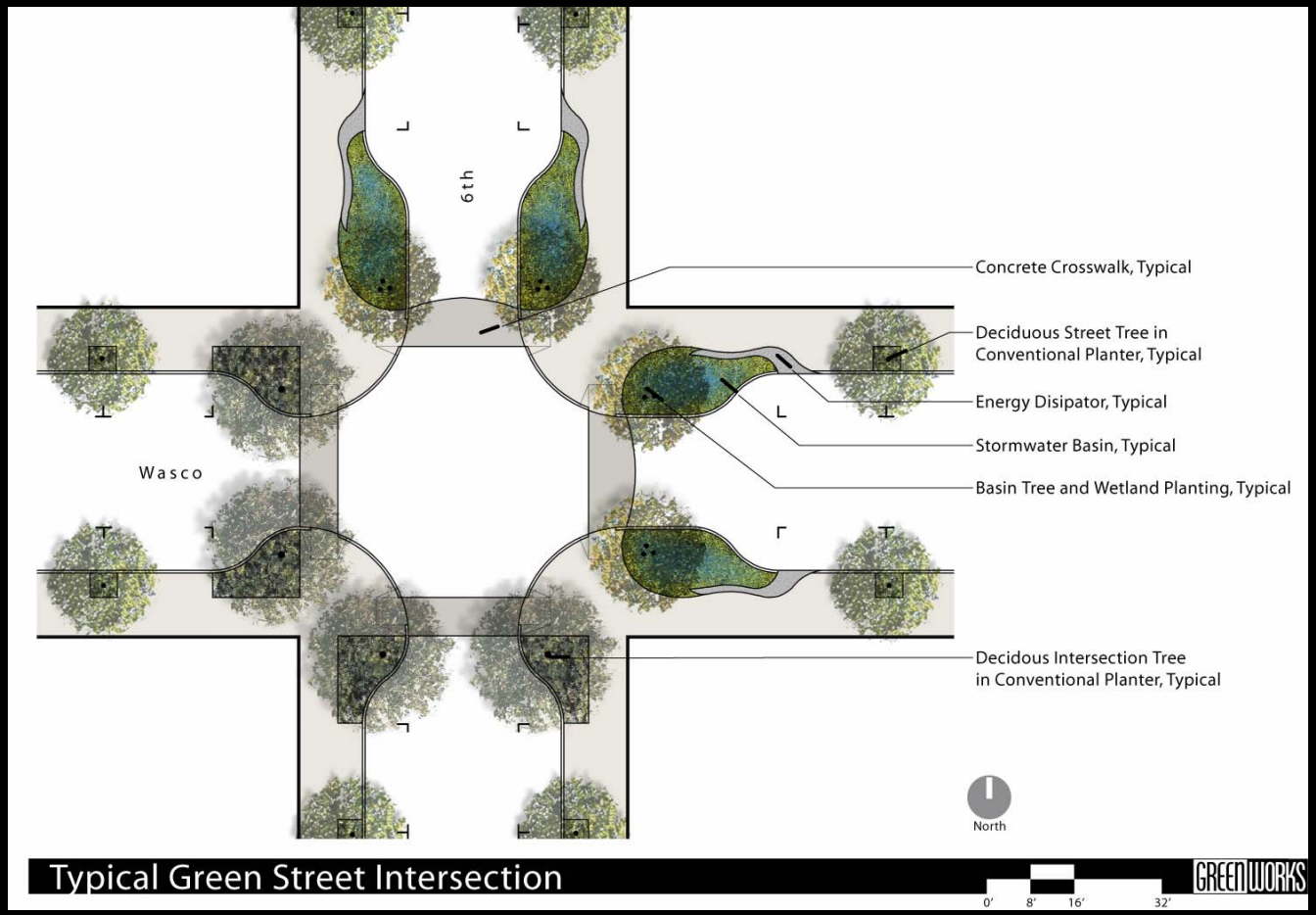
MITHŪN



placemaking

landscape & habitat

MITHŪN

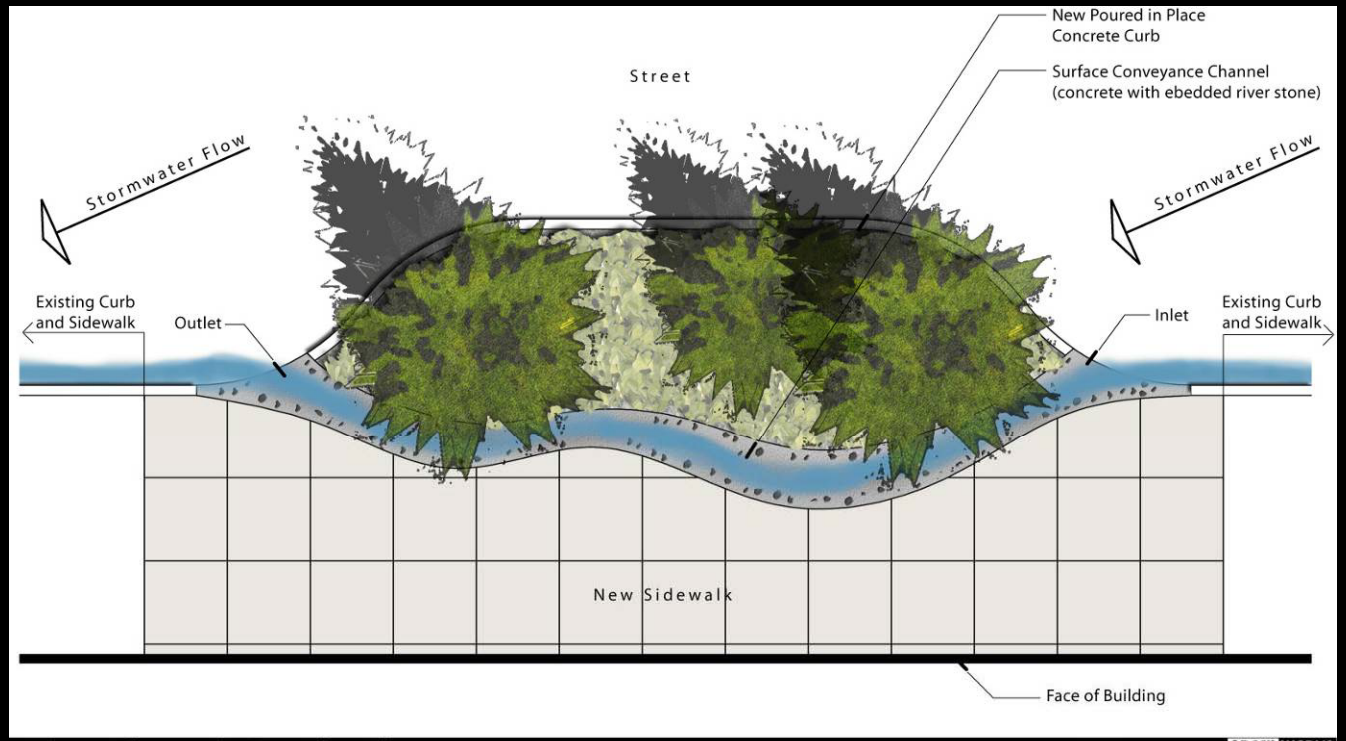


Typical Green Street Intersection

placemaking

landscape & habitat

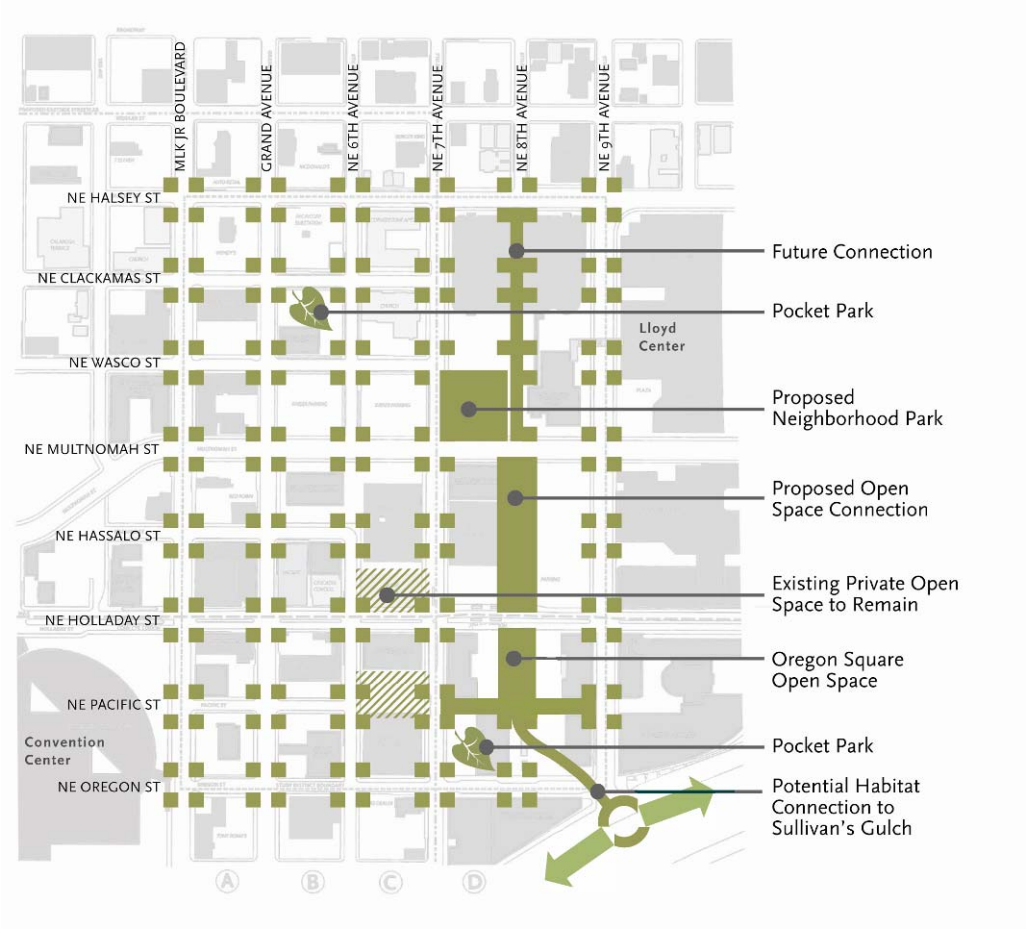
MITHŪN



placemaking

open space plan

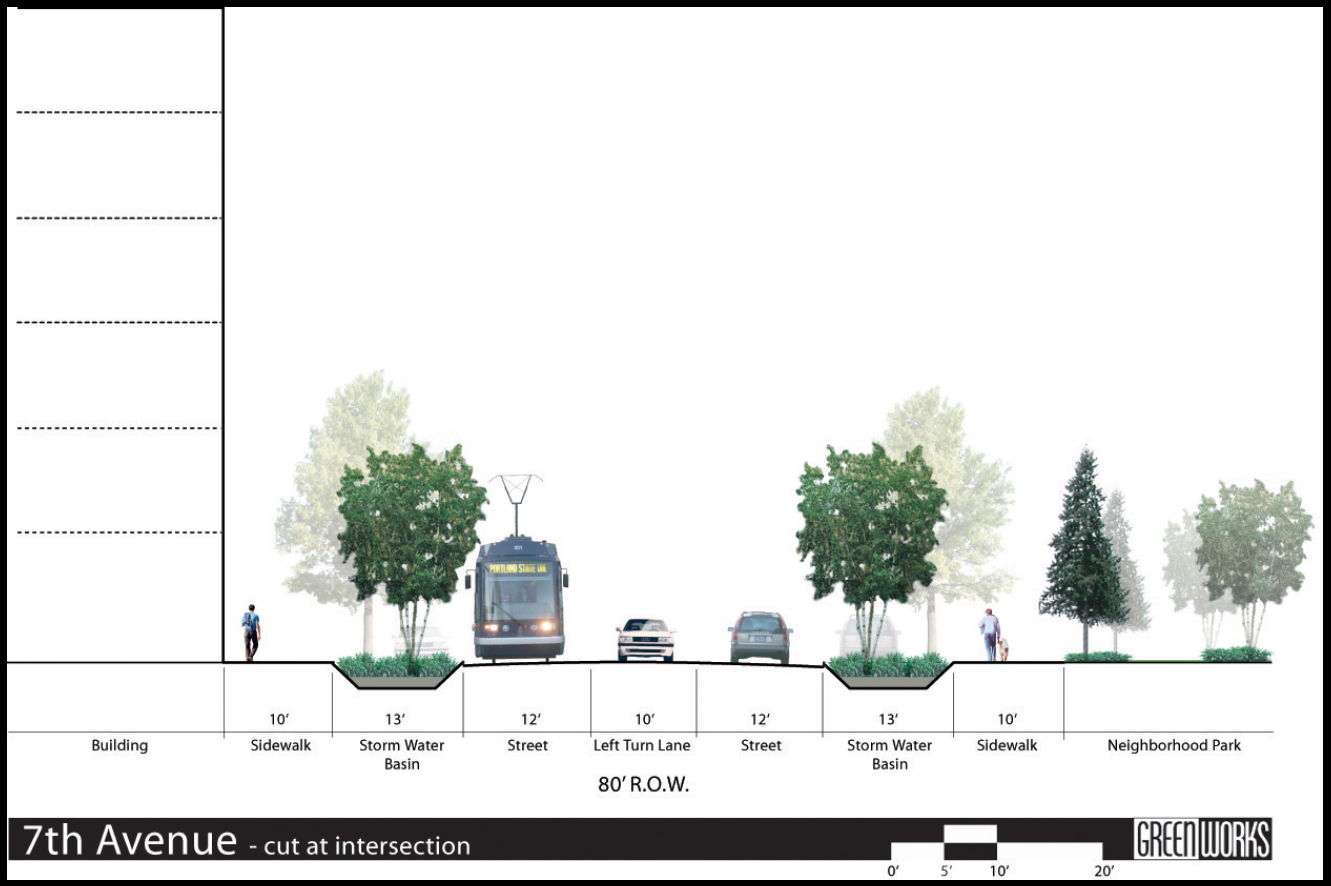
MITHŪN



placemaking

landscape & habitat

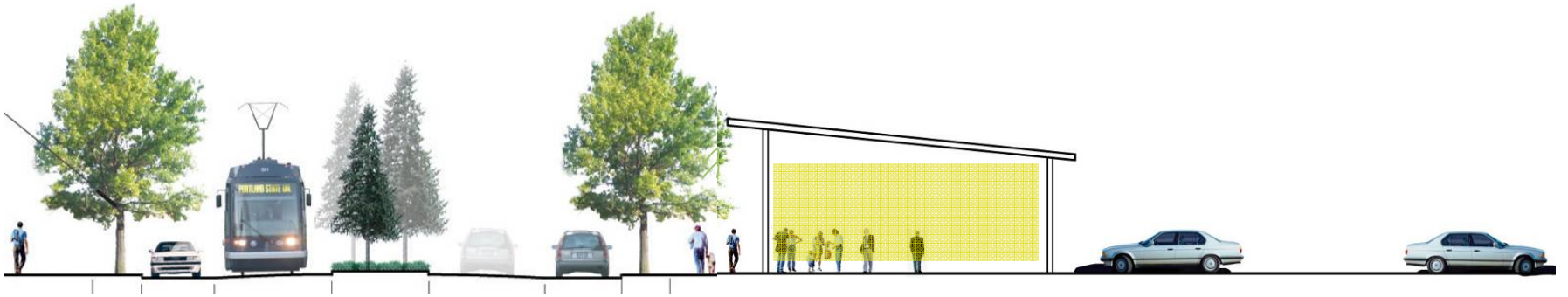
MITHŪN



placemaking

street vitality

interim retail to activate a dynamic street life



water use

water neutral

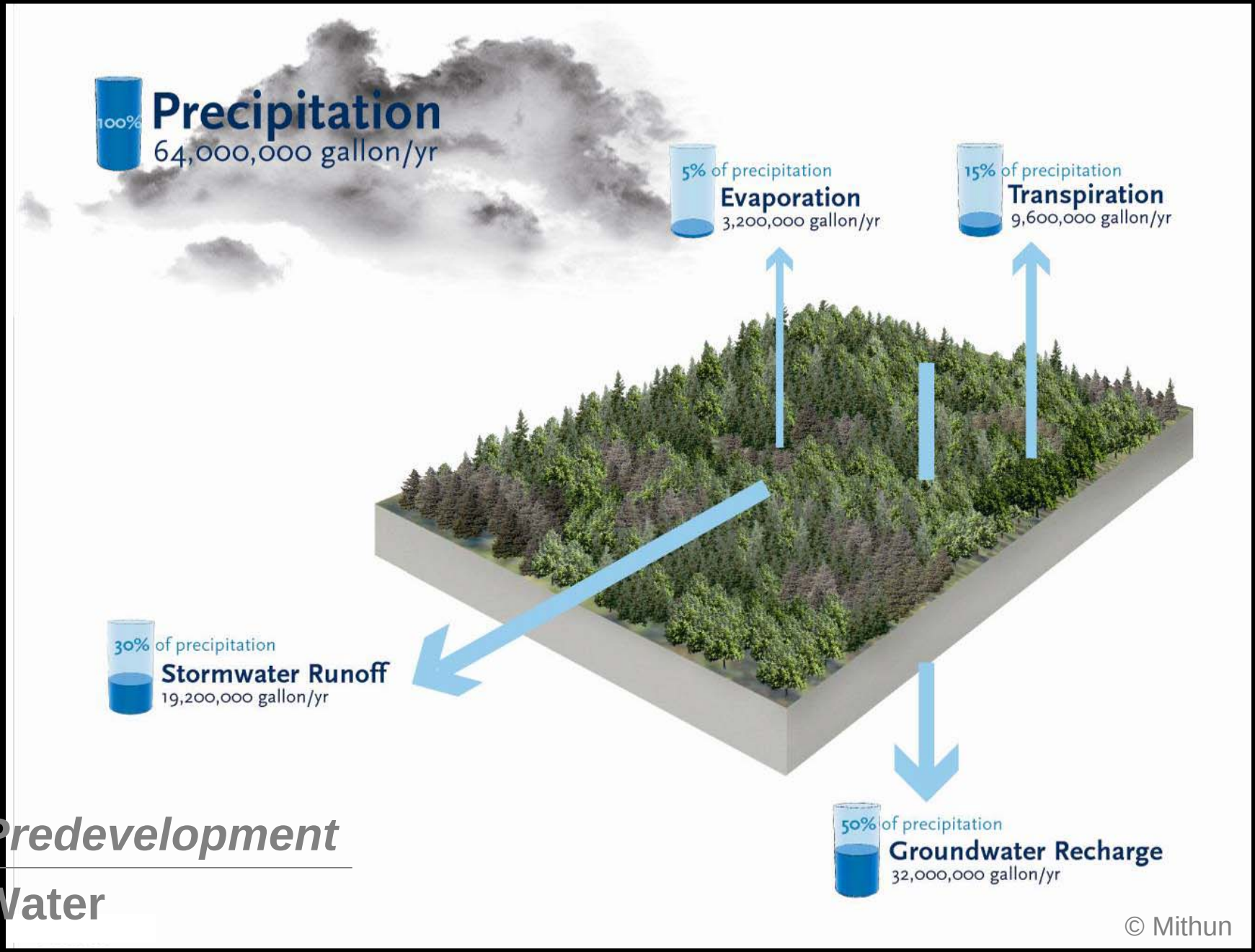
vision

a water

neutral

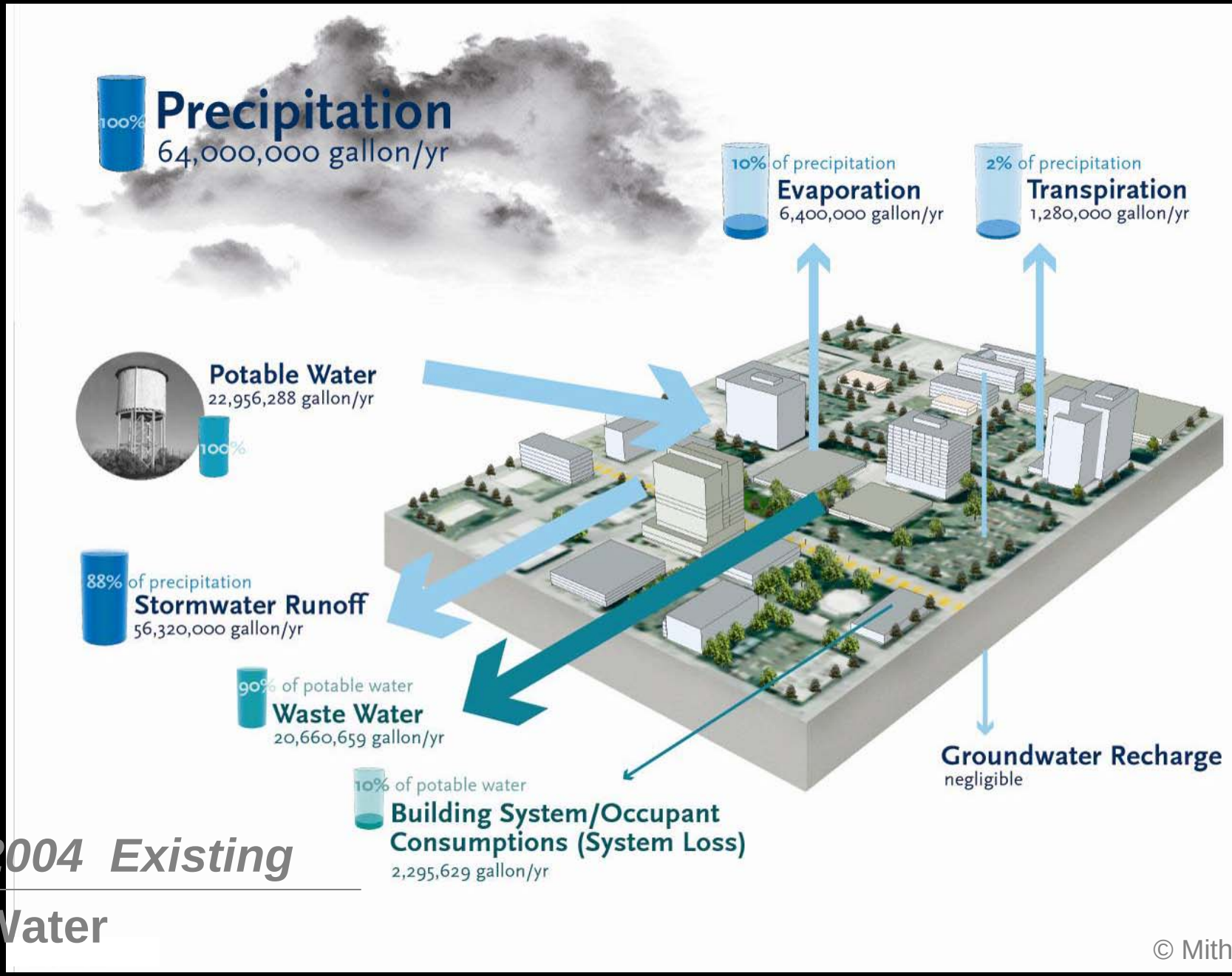
lloyd study area

MITHŪN



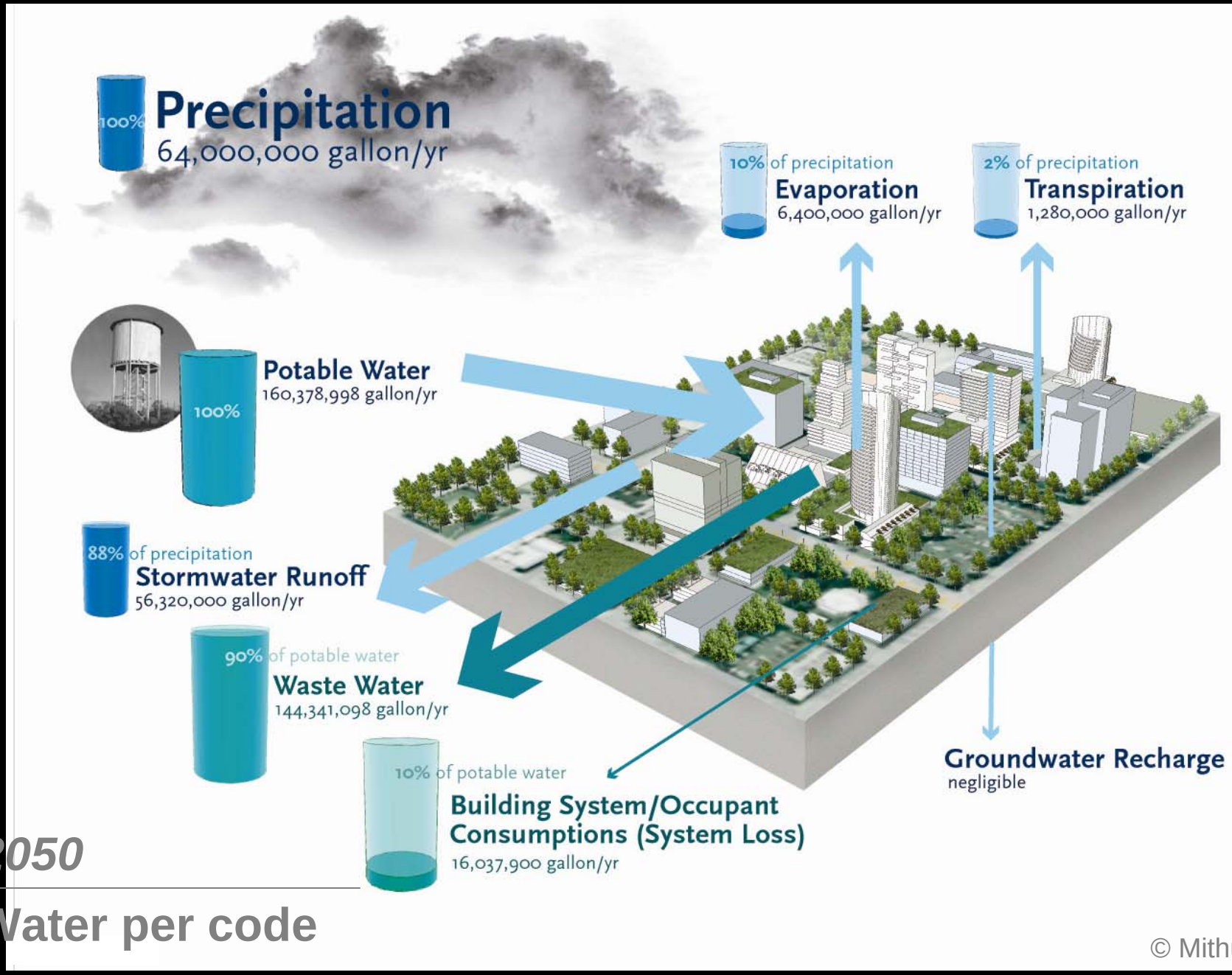
Predevelopment

Water



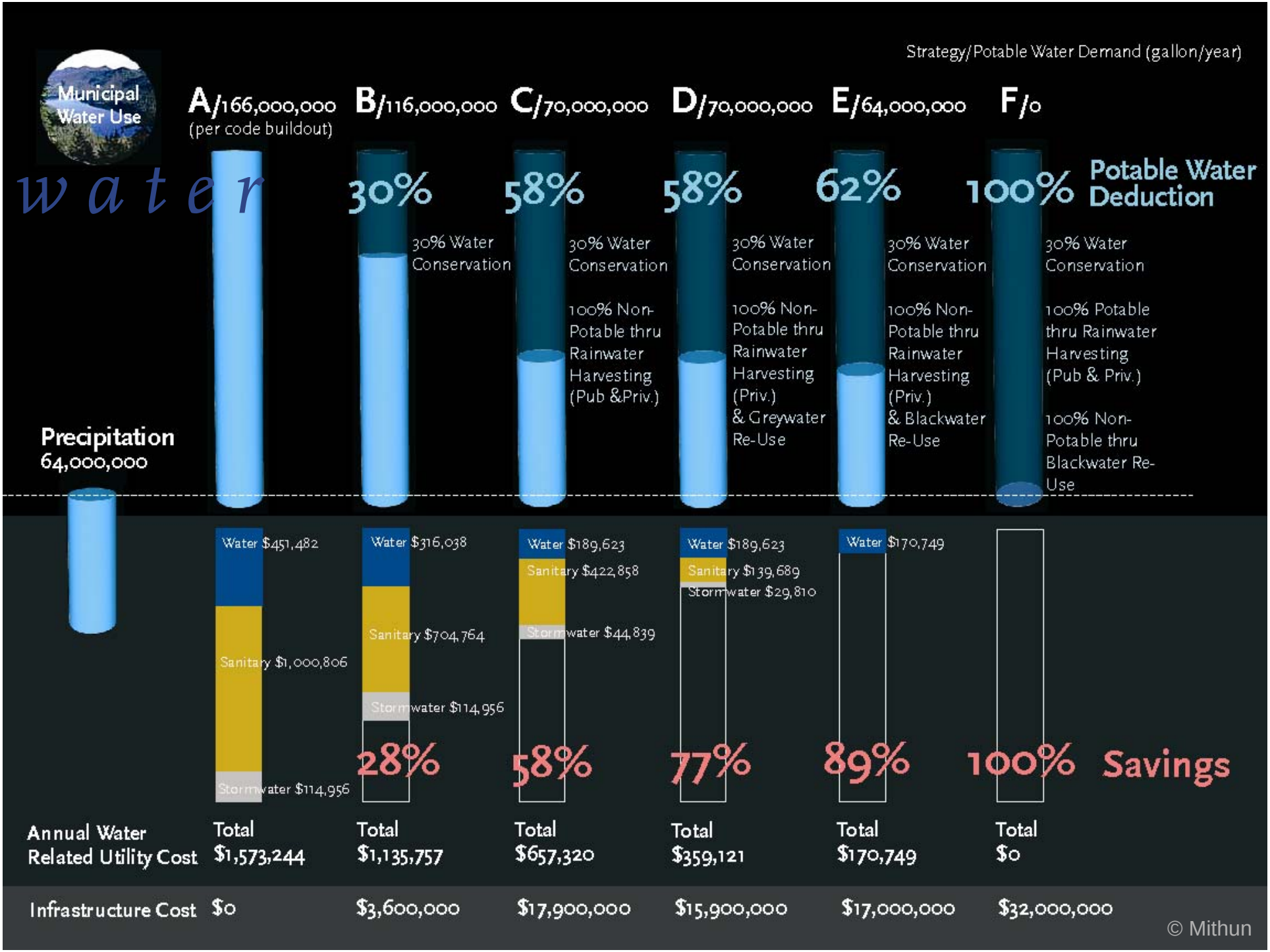
2004 Existing

Water



2050

Water per code


Municipal Water Use
water
Strategy/Potable Water Demand (gallon/year)
A/166,000,000
(per code buildout)
B/116,000,000
C/70,000,000
D/70,000,000
E/64,000,000
F/0
30%
58%
58%
62%
100%
Potable Water Deduction
30% Water Conservation
30% Water Conservation
100% Non-Potable thru Rainwater Harvesting (Pub &Priv.)
30% Water Conservation
100% Non-Potable thru Rainwater Harvesting (Priv.) & Greywater Re-Use
30% Water Conservation
100% Non-Potable thru Rainwater Harvesting (Priv.) & Blackwater Re-Use
30% Water Conservation
100% Potable thru Rainwater Harvesting (Pub & Priv.)
100% Non-Potable thru Blackwater Re-Use
Precipitation
64,000,000
Water $451,482
Sanitary $1,000,806
Stormwater $114,956
Water $316,038
Sanitary $704,764
Stormwater $114,956
Water $189,623
Sanitary $422,858
Stormwater $44,839
Water $189,623
Sanitary $139,689
Stormwater $29,810
Water $170,749
28%
58%
77%
89%
100%
Savings
Annual Water Related Utility Cost
Total $1,573,244
Total $1,135,757
Total $657,320
Total $359,121
Total $170,749
Total $0
Infrastructure Cost
$0
$3,600,000
$17,900,000
$15,900,000
$17,000,000
$32,000,000

District Water Management Strategy	Strategy A	Strategy B	Strategy C	Strategy D	Strategy E	Strategy F
Capital Costs	***$0***	***$3,616,550***	***$17,941,550***	***$17,246,150***	***$16,716,676***	***$34,129,505***
B Efficiency Upgrades		$2,487,500	$2,487,500	$2,487,500	$2,391,448	$2,391,448
Stormwater Management - Streets		$752,700	$752,700	$752,700	$752,700	$752,700
Stormwater Management - Buildings		$376,350	$376,350	$376,350	$597,862	$597,862
Rainwater Harvesting System			$1,000,000	$800,000	$337,171	
Rainwater Harvesting Storage			$8,350,000	$3,250,000	$3,250,000	
Additional Plumbing - Buildings			$4,975,000	$4,975,000	$4,782,895	$4,782,895
Additional Pipes - Streets				$634,500	$634,500	$634,500
Greywater Treatment System				$2,000,000		
Greywater Storage				$1,970,100		
Blackwater Treatment System					$2,000,000	$3,000,000
Blackwater Storage					$1,970,100	$1,970,100
Rainwater Treatment System (for potable use)						$3,000,000
Rainwater Treatment Storage						$17,000,000
Operations and Maintenance Costs (per year)	***$0***	***$56,453***	***$139,953***	***$167,757***	***$283,365***	***$718,626***
Stormwater Management System		$56,453	$56,453	$56,453	$56,453	$56,453
Rainwater Harvesting System			$83,500	$32,500	$17,500	
Greywater Treatment System				$78,804		
Blackwater Treatment System					$209,412	$236,412
Rainwater Treatment System (for potable use)						$425,762
Savings (per year)	***$0***	***$437,486***	***$915,924***	***$1,[illegible]***	***$1,402,495***	***$1,573,244***
Water	$0	$135,444	$261,859	$2[illegible]	$280,733	$451,482
Sanitary Sewer	$0	$302,042	$583,948	$867,1[illegible]	$1,006,806	$1,006,806
Stormwater	$0	$0	$70,117	$85,146	$114,956	$114,956
Pavback Period						
Straight Payback		9	23	16	15	40
Return on Investment (ROI)						

15 year payback

kpff

lloyd water

strategy E

89% Savings

64,000,000 gallons per year

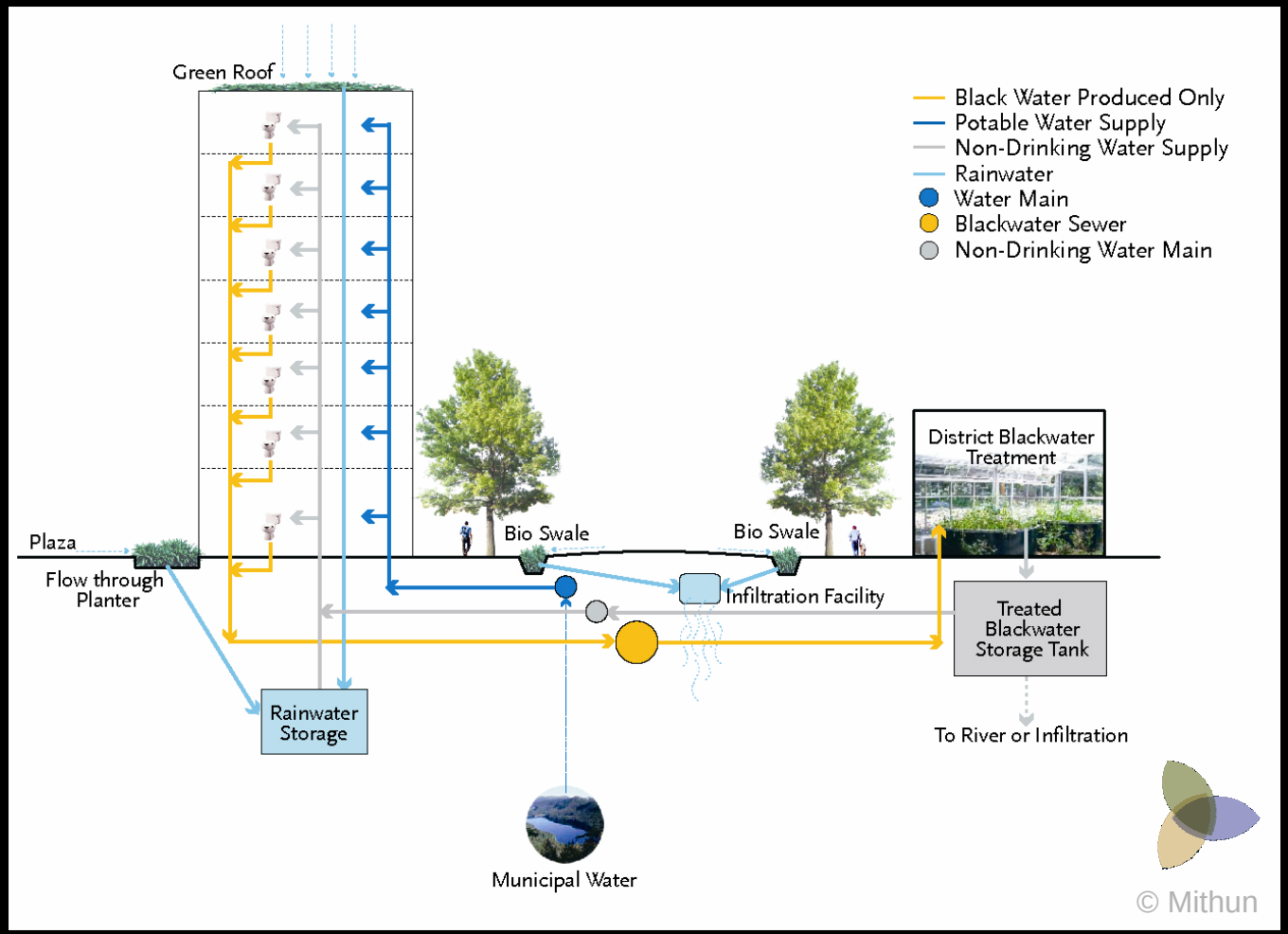
30% Water Conservation through Fixture Efficiency

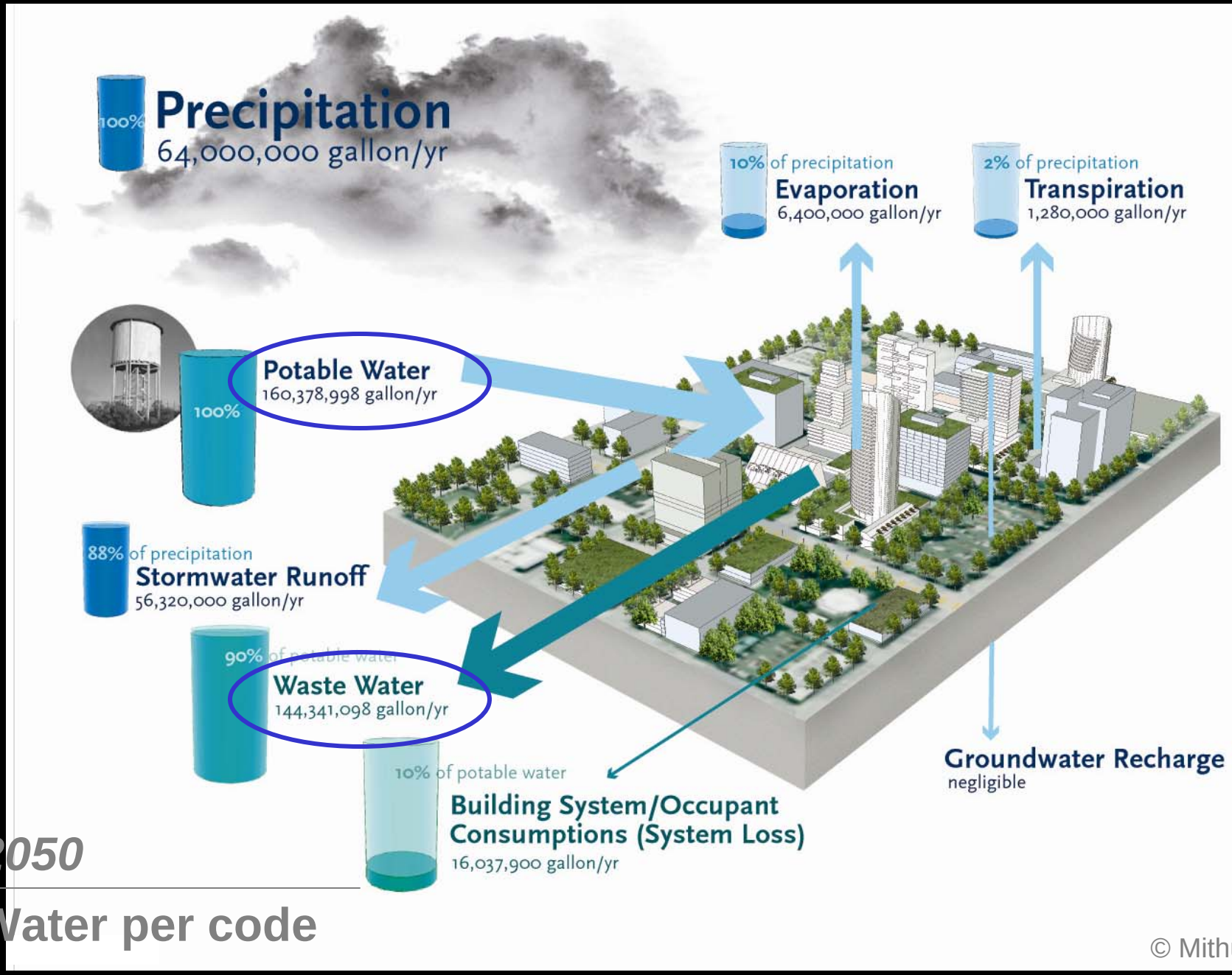
100% Non-Potable thru Rainwater Harvesting (Private Property) & Blackwater Reuse

MITHUN

62%

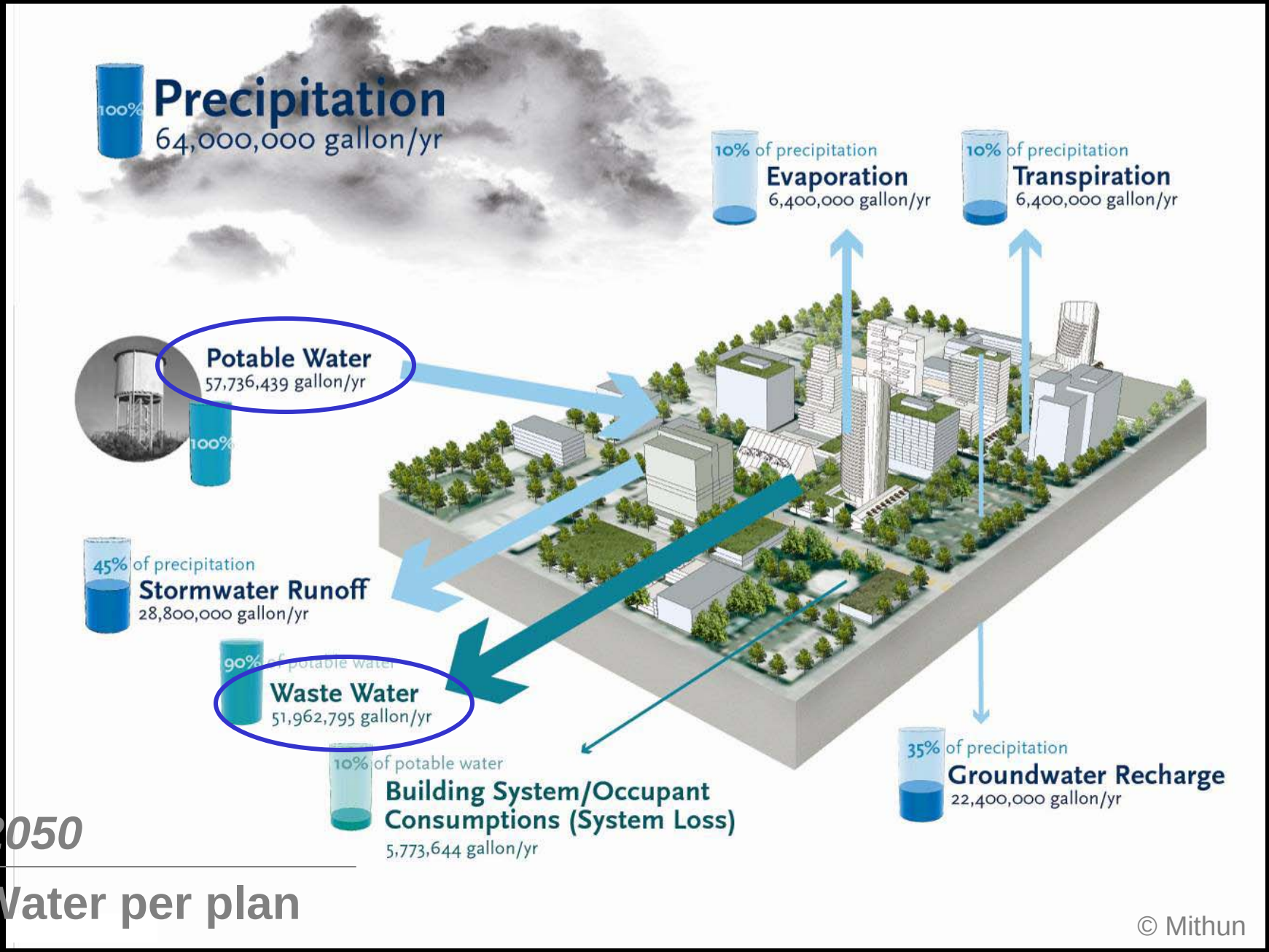
Potable Water Demand Reduction





2050

Water per code



2050

Water per plan

energy

carbon neutral

vision

a carbon

neutral

lloyd study area

MITHŪN

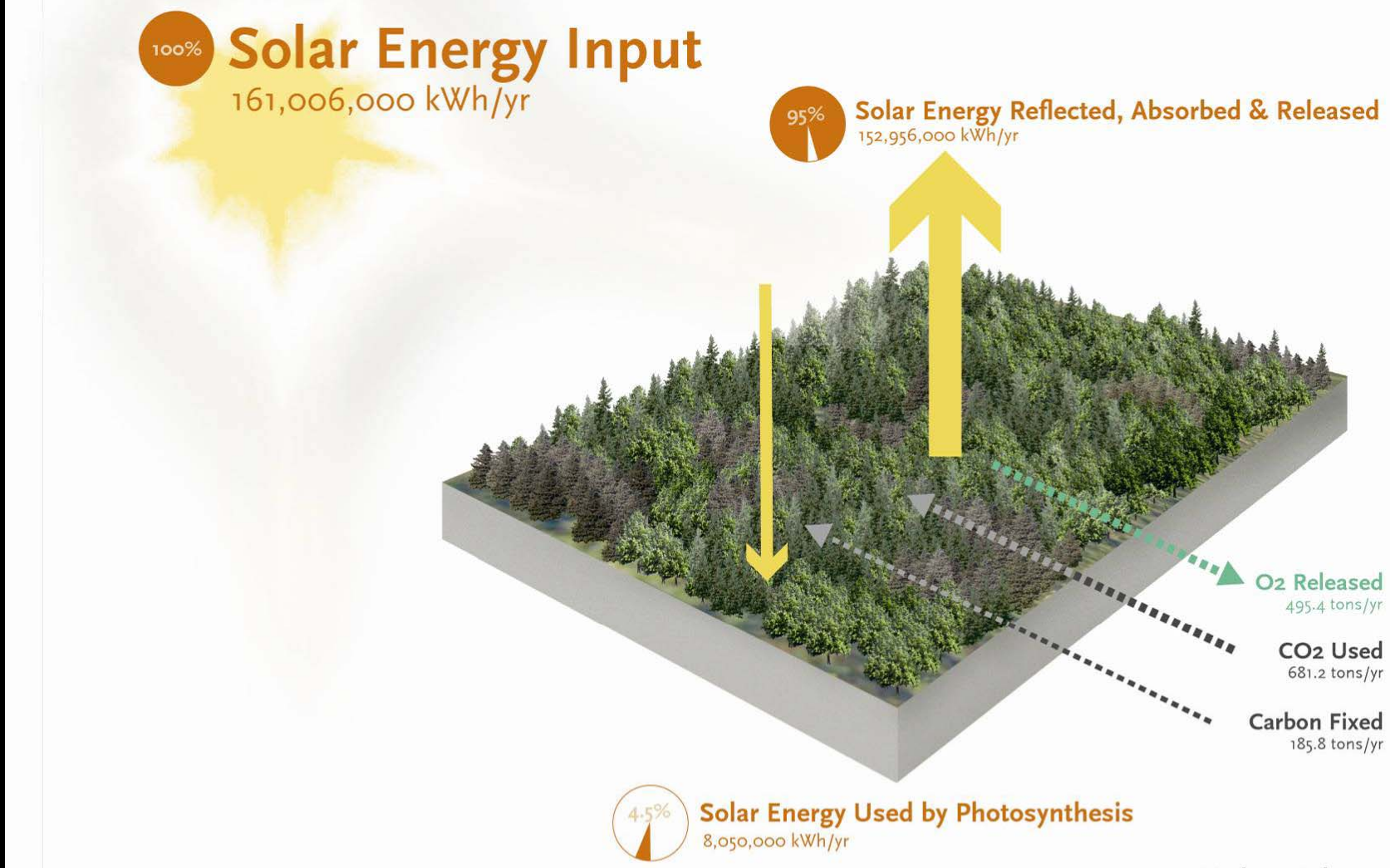
energy

total energy

vision

live within the study area annual solar budget

MITHŪN



Energy - predevelopment

energy

energy path

preferred path

carbon neutral

building efficiency +

wind power & carbon offsets

+

improved solar use

in study area wind power

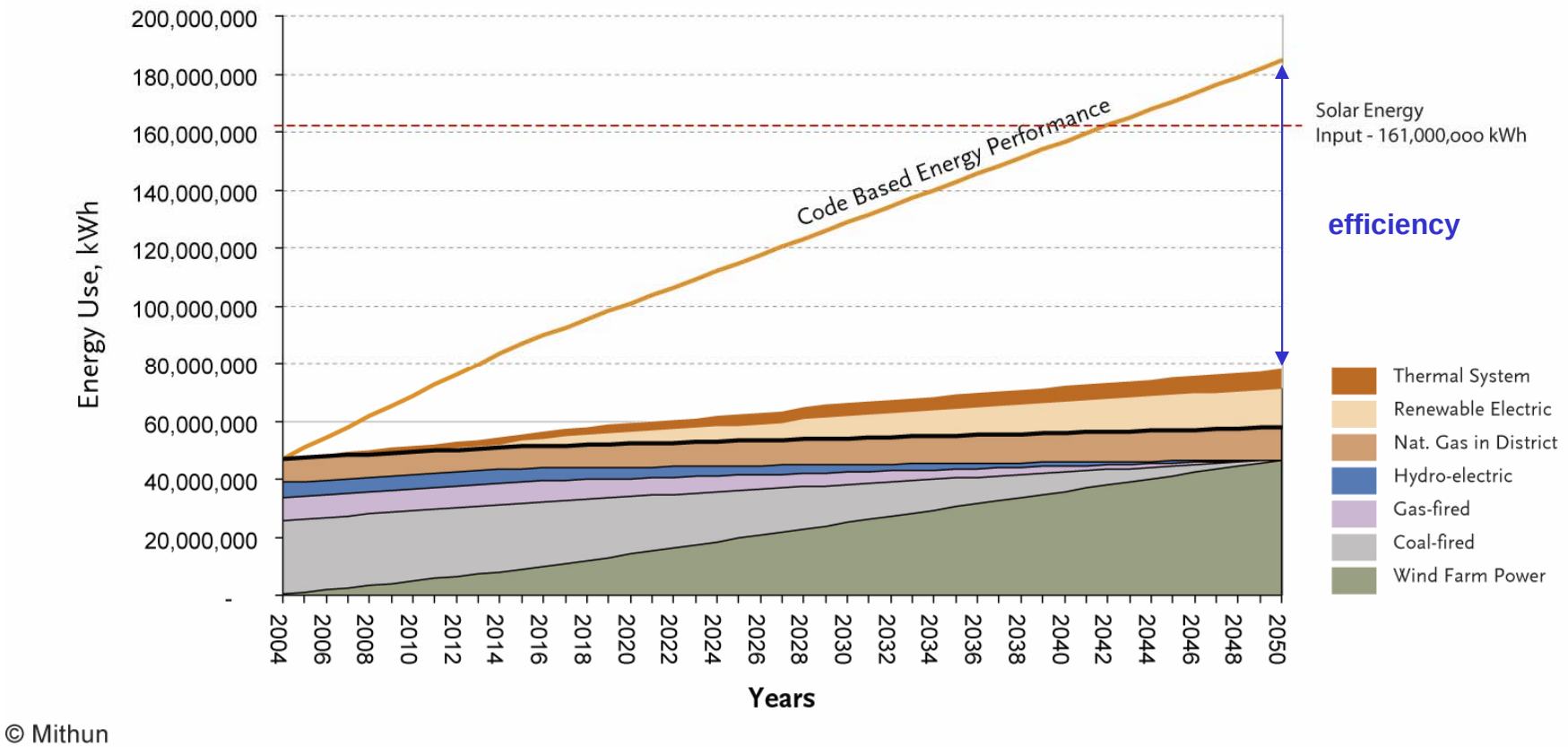
integrated building &

district infrastructure

MITHŪN

energy

energy path



Carbon Balance

Solar Energy Input

161,006,000 kWh/yr

Future photovolltaic efficiencies may improve utilization factor.

Solar Energy Utilized

habitat

landscape & habitat

vision

predevelopment

habitat metrics

through on & off site

strategies

MITHŪN

Habitat

Tree Cover 25-30%

2050 Primary Goals:

- Establish wildlife connectivity through the creation of wildlife corridors linking the Lloyd Crossing area with significant adjacent habitats such as the Willamette River and Sullivan's Gulch.

Tree species include:
Doug Fir
Red Alder
Bigleaf Maple

2050 Secondary Goals
On-Site

- Creation of a "bio artery", providing avian, aquatic, and invertebrate habitat.
- Rooftop gardens providing avian and insect habitat.
- Increased Tree Canopy providing avian habitat
- Understory planting along greenways providing avian habitat.
- Storm water treatment and detention facilities providing avian, invertebrate, and possibly aquatic habitat.

Off-Site:

- Sullivan's Gulch Wildlife Corridor providing avian, terrestrial, insect habitat.
- Holiday Park water detention facility providing avian, invertebrate and possibly aquatic habitat.
- Stream Restoration along Sullivan's Gulch providing avian, invertebrate and aquatic habitat.
- Rose Garden redevelopment as possible link to river providing avian, terrestrial, aquatic and invertebrate habitat.

2050 - Habitat per Plan

development

urban growth boundary metrlcs

vision

utilize all

available FAR

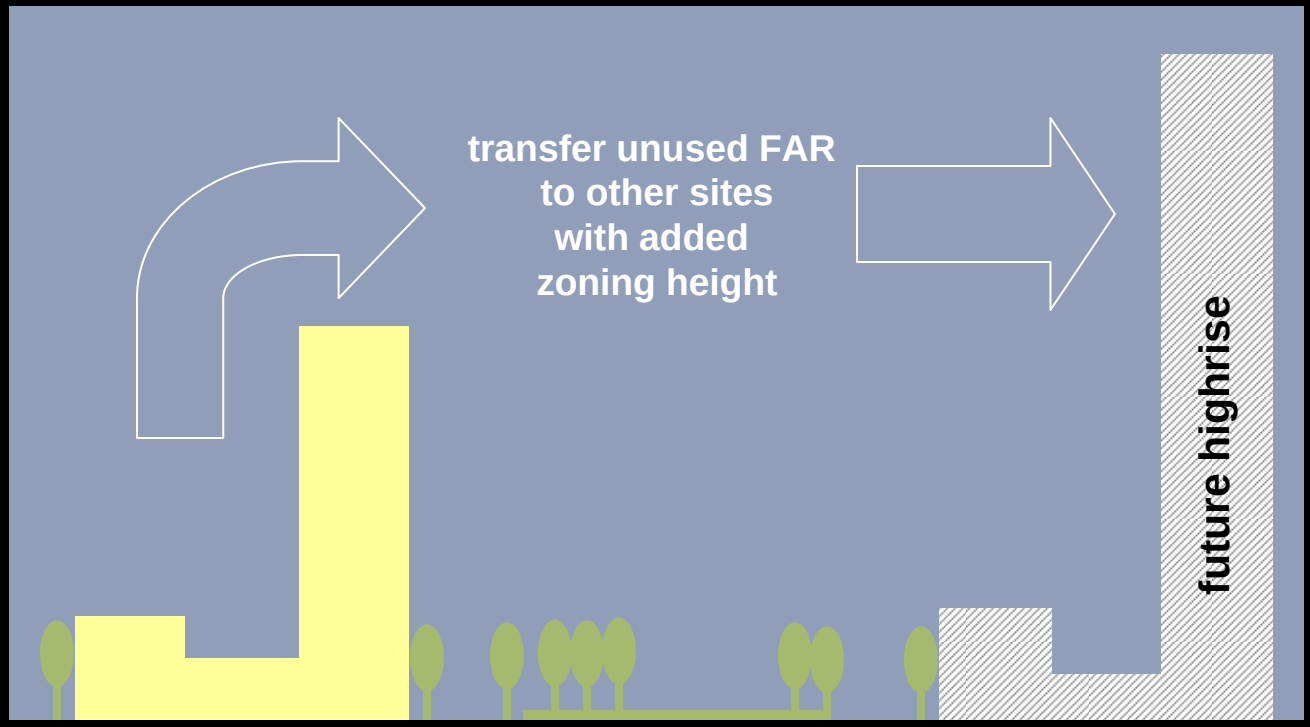
within study area

MITHŪN

implementation

land use & zoning

allow FAR transfer with increased height



MITHŪN

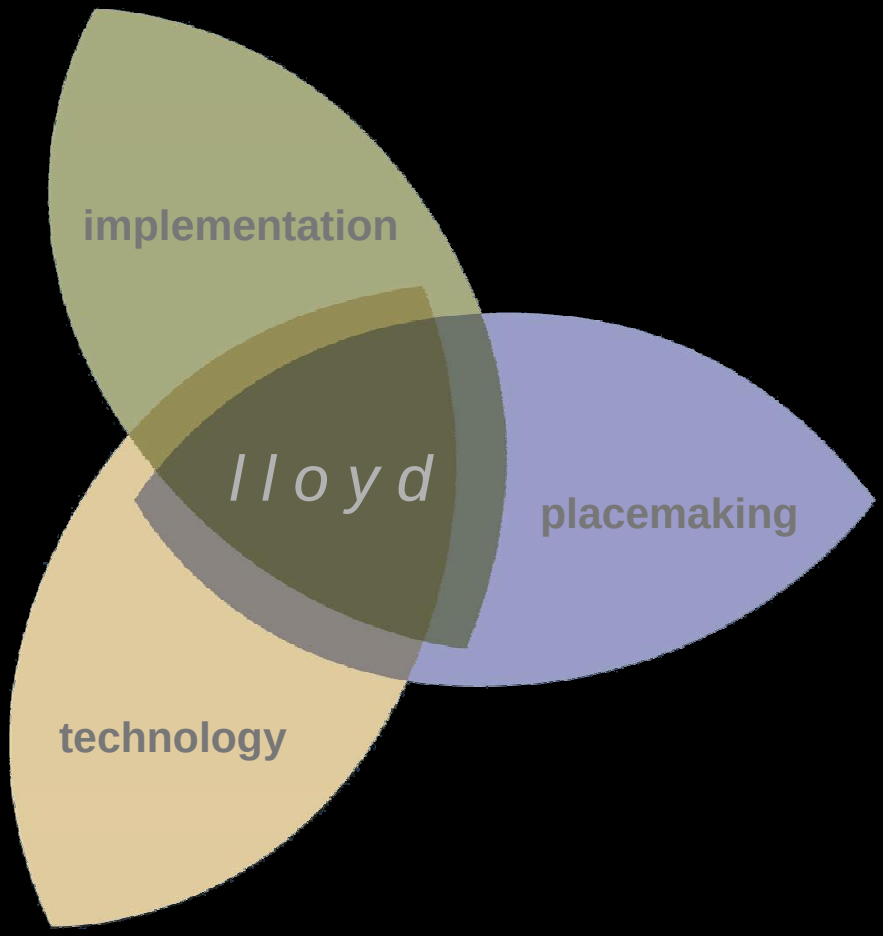
park

future phase

initial phase

implementation

financial strategy



MITHŪN

HEARTLAND

implementation

implementation strategies

vision

create an entitity

to implement the

sustainable urban

design plan

MITHŪN

implementation

responsIbility

rma

city

resource management assoc.

building owner

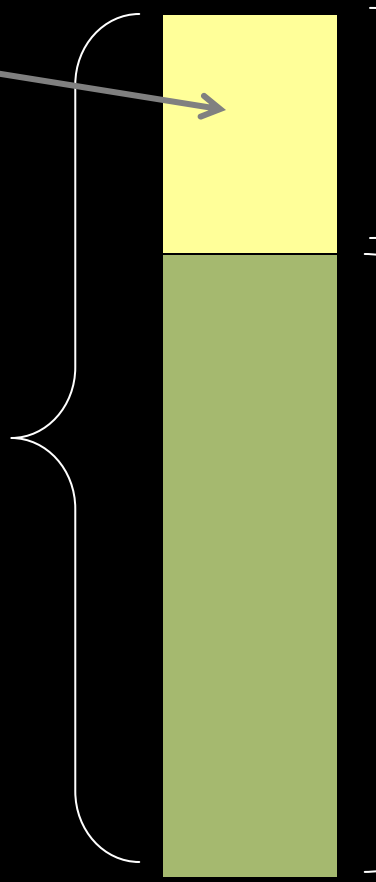
tenant

MITHŪN

r m a

s o u r c e s o f c a p i t a l

OE Trust
Bond
L.I.D.
% SDC redirect
Etc.



RMA
Capital
Investment

Total Capital
Investment
With RMA

Property
Owner
Investment

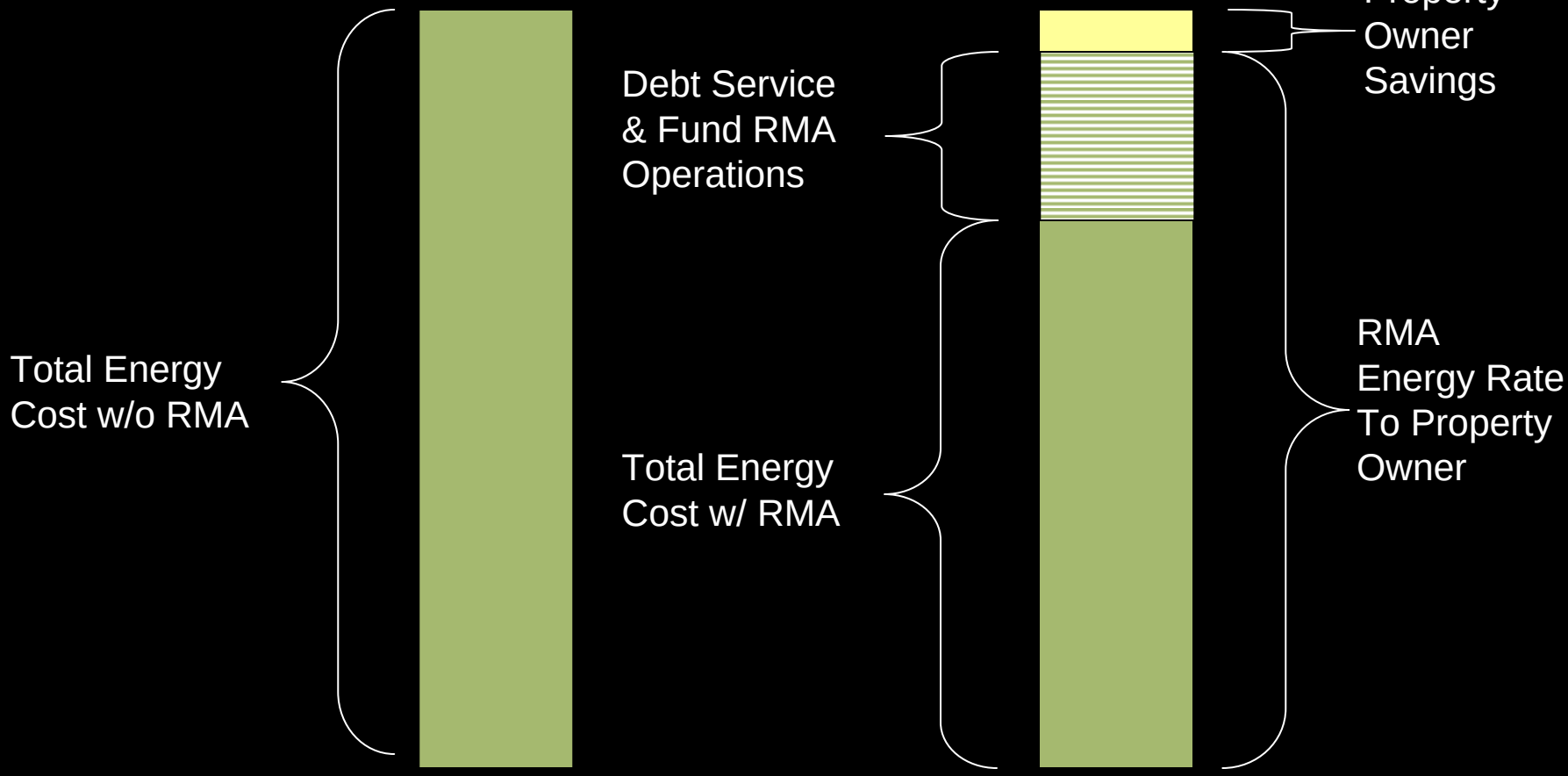
Sources of Capital

Potential RMA Investments

ON SITE:
On Site Study Area Strategies
Building Strategies
new construction
retrofit existing
OFF SITE:
Off Site Study Area Strategies

r m a

o p e r a t I n g m o d e l

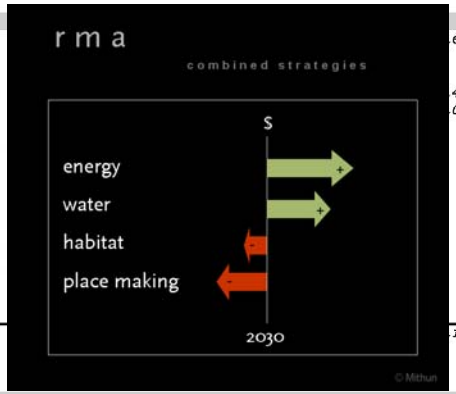


r m a

combined strategies

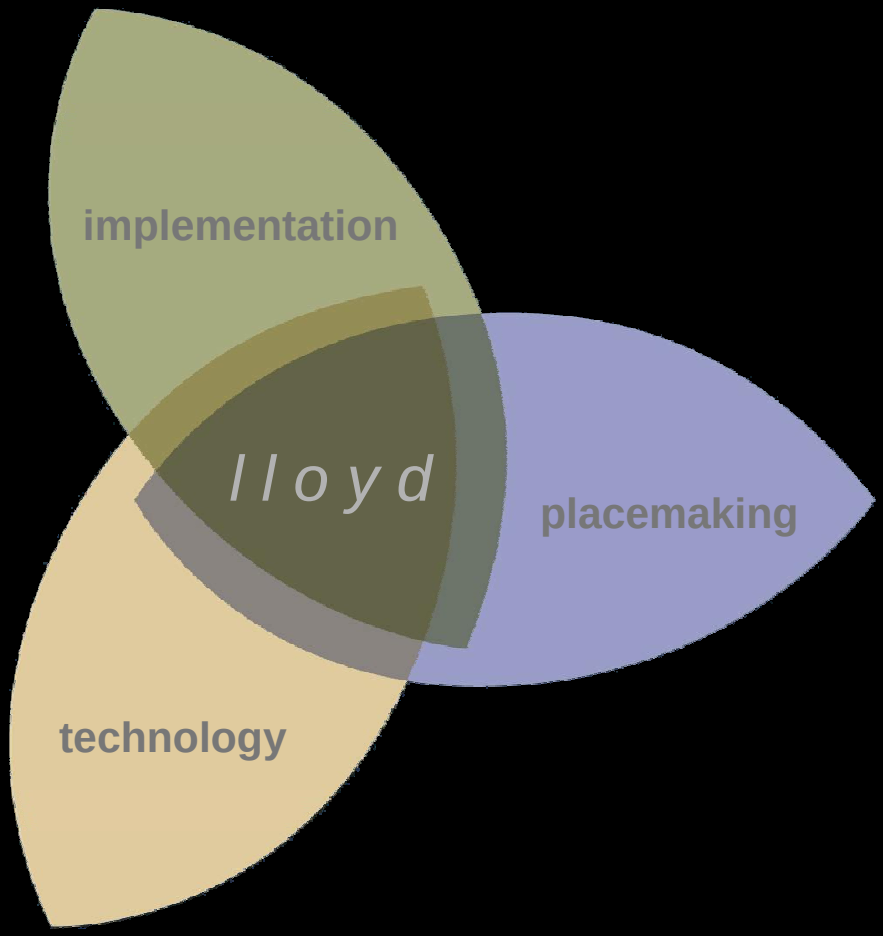
OVERALL SUMMARY

Uses:		Total	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
WATER												
Building Improvements		$ 9,480,491	$ 2,100,499	$ 1,572,498	$ 829,374	$ 832,534	$ 835,693	$ 838,853	$ 842,012	$ 845,172	$ 848,331	$ 36,31
District Improvements		$ 8,336,249	$ 1,717,635	$ 37,635	$ 4,851,647	$ 247,047	$ 247,047	$ 247,047	$ 247,047	$ 247,047	$ 247,047	$ 247,04
		$ 17,816,741										
ENERGY (inflated @ 2%)		$ 316,047,076	$ 4,071,532	$ 19,047,715	$ 24,240,090	$ 24,032,884	$ 28,045,143	$ 33,542,736	$ 38,171,772	$ 43,235,087	$ 48,298,402	$ 53,361,71
HABITAT / OPEN SPACE		$ 32,125,750	$ 5,880,600	$ 5,472,225	$ 12,419,450	$ 1,406,250	$ 6,947,225	$ -	$ -	$ -	$ -	$ -
PLACEMAKING		$ 14,653,750	$ 14,653,750	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Total Uses:	$ 380,643,317	$ 28,424,016	$ 26,130,073	$ 42,340,561	$ 26,518,715	$ 36,075,109	$ 34,628,636	$ 39,260,832	$ 44,327,306	$ 49,393,780	$ 53,645,08
Sources:												
WATER	*Savings Reinvested @ 80%$*	$ 40,212,445	$ 1,202,221	$ 1,709,206	$ 3,497,996				681	$ 5,207,590	$ 5,552,493	$ 5,641,71
ENERGY												
Offsets	*Inflation @ 2%*	$ 84,739,389	$ 1,339,105	$ 7,115,812	$ 8,030,715				456	$ 10,418,902	$ 11,077,807	$ 11,771,63
Savings	*Reinvested @ 80%*	$ 260,698,421	$ 634,557	$ 4,129,814	$ 7,729,092				047	$ 42,706,185	$ 49,904,479	$ 57,112,88
HABITAT / OPEN SPACE		$ -	$ -	$ -	$ -				-	$ -	$ -	$ -
OTHER POTENTIAL FUNDING SOURCES												
Urban Renewal Funds		$ -	$ -	$ -	$ -				-	$ -	$ -	$ -
Tax Increment Financing		$ -	$ -	$ -	$ -				-	$ -	$ -	$ -
Local Improvement District		$ -	$ -	$ -	$ -				-	$ -	$ -	$ -
New Market Tax Credits		$ -	$ -	$ -	$ -				-	$ -	$ -	$ -
EPA Sustainability Pilot Grant		$ -	$ -	$ -	$ -				-	$ -	$ -	$ -
Subtotal - Other		$ -	$ -	$ -	$ -				-	$ -	$ -	$ -
	Total Sources:	$ 385,650,255	$ 3,175,883	$ 12,954,832	$ 19,257,803				185	$ 58,332,677	$ 66,534,780	$ 74,526,23
Net Cash Flow:												
WATER	5-Year Cash Flow:	$ 22,395,705	$ (2,615,913)	$ 99,072	$ (2,183,025)	$ 2,758,344	$ 3,096,108	$ 3,434,868	$ 3,774,622	$ 4,115,371	$ 4,457,114	$ 5,358,35
	Payback Year:			2010		2020						
ENERGY	5-Year Cash Flow:	$ 29,390,733	$ (2,097,870)	$ (7,802,088)	$ (8,460,263)	$ (2,529,578)	$ 1,317,927	$ 3,763,210	$ 7,122,731	$ 9,890,000	$ 12,683,885	$ 15,522,80
	Payback Year:						2025					
HABITAT / OPEN SPACE	5-Year Cash Flow:	$ (32,125,750)	$ (5,880,600)	$ (5,472,225)	$ (12,419,450)	$ (1,406,250)	$ (6,947,225)	$ -	$ -	$ -	$ -	$ -
	Payback Year:											
PLACEMAKING	5-Year Cash Flow:	$ (14,653,750)	$ (14,653,750)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Payback Year:											
	GRAND TOTAL DISTRICT CASH FLOW:	$ 5,006,938	$ (25,248,134)	$ (13,175,241)	$ (23,082,758)	$ (1,177,484)	$ (2,533,190)	$ 7,198,078	$ 10,897,353	$ 14,005,370	$ 17,140,999	$ 20,881,15
	Payback Year:							2030				



catalyst project

project components



MITHŪN

catalyst project

project components

components of the catalyst project:

buildings, park, streets, parking, habitat, infrastructure

MITHŪN

private
public
RMA

catalyst project

site option A.1 & A.2 – plan view

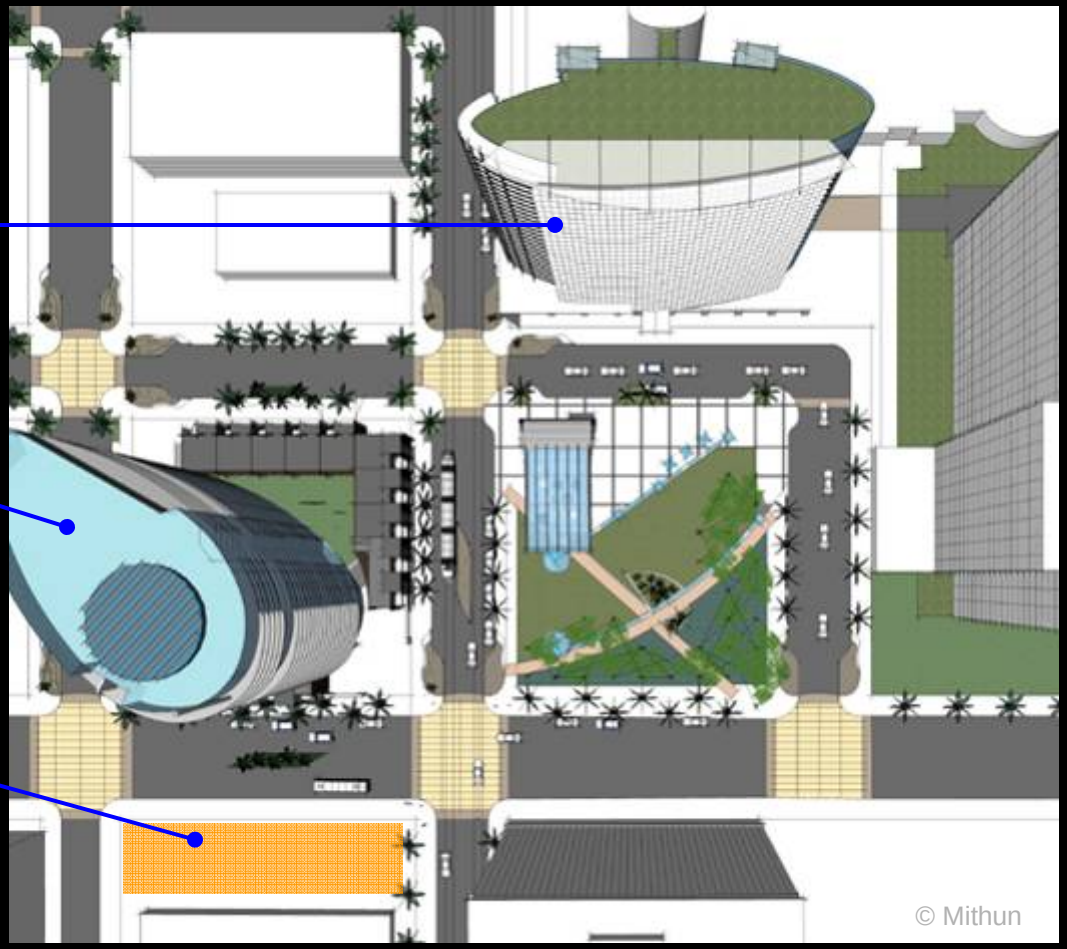
high-rise alternate

catalyst residential tower

- *solar sail – PV*
  - single loaded cross ventilation
- *wind ellipse*
  - double loaded pressure differential natural ventilation

MITHŪN

- interim retail along key street fronts



catalyst project

aerial view from east

high-rise alternate

MITHŪN

café / living machine in park

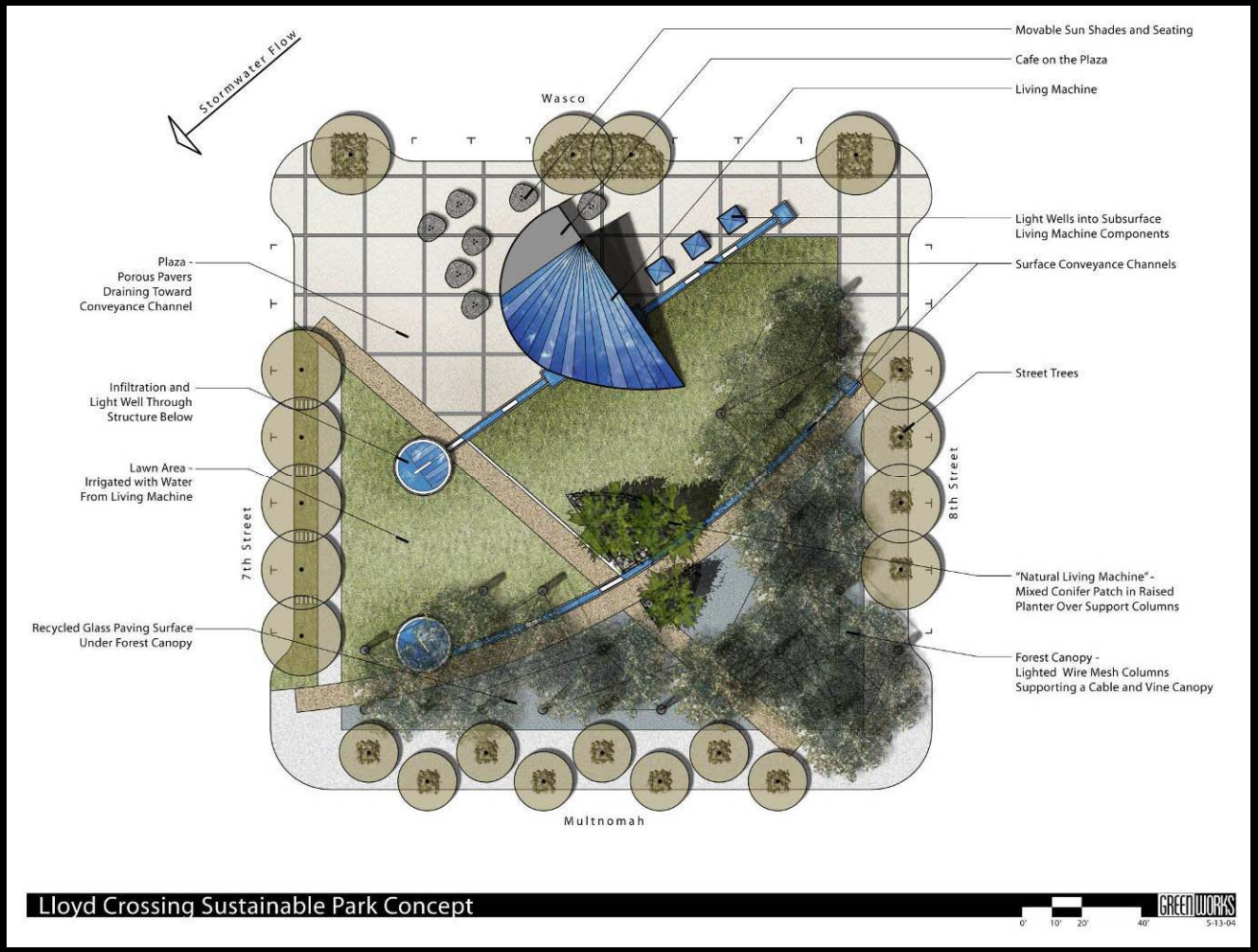
catalyst project

project components

open space

park concept

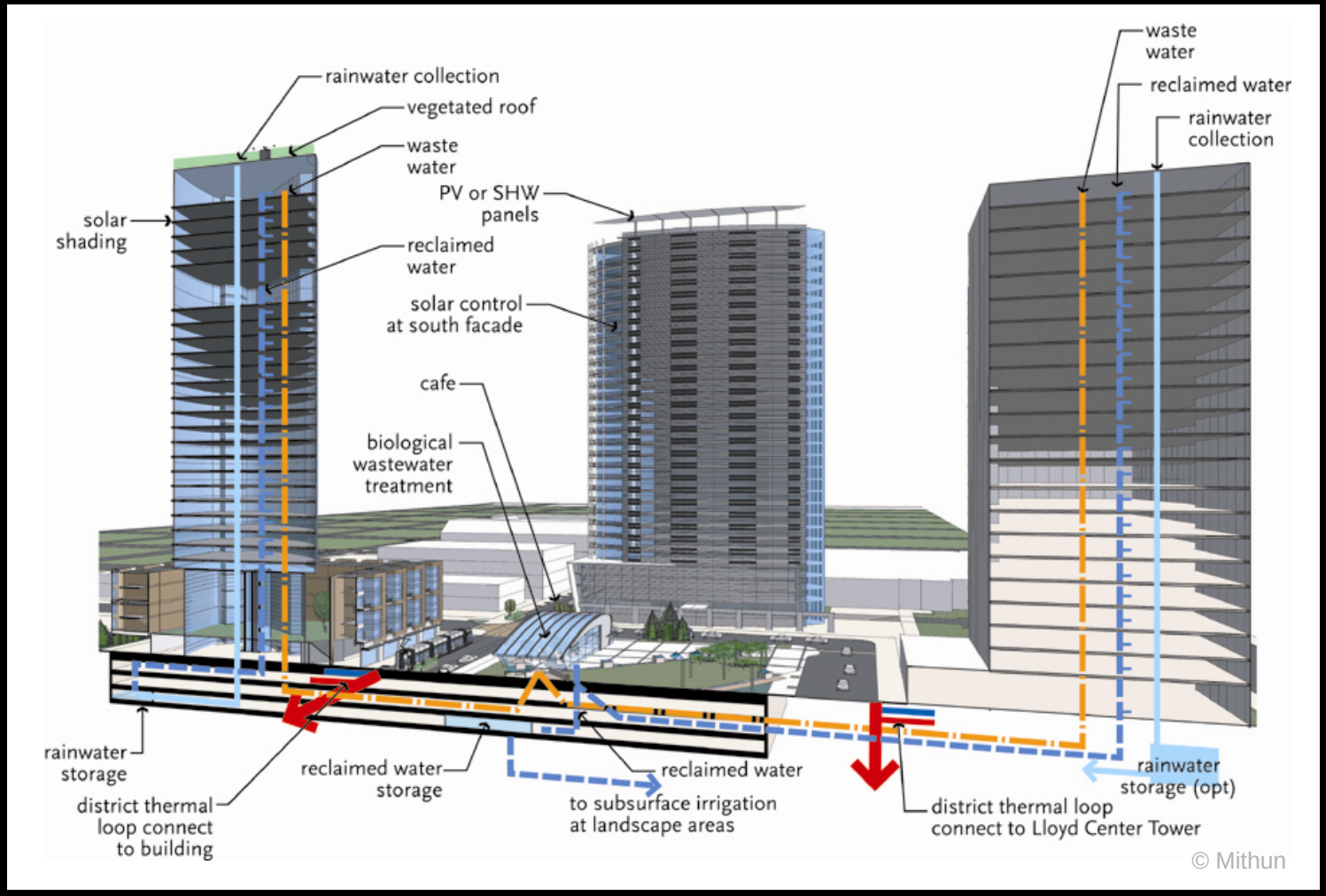
MITHŪN



catalyst project

sustainable strategies

MITHŪN



lloyd crossing

sustainable urban design plan

MITHŪN

l l o y d b r a n d i n g

i d e n t i t y

quality:

healthy values
sustainability
sound economics

implementation

implementation strategies

next steps

review tax policy opportunities

review rma structure & composition

review rma regulatory & political viability

test private sector participation incentive

investigate “esco” private rma operation

catalyst site verification

catalyst implementation strategies

study area tower wind & solar plan analysis

MITHŪN

21st century planning

urban resources

- master planning integrated with habitat and resource planning
- neighborhood scale distributed resource systems
- public realm synergies & public – private partnerships filling the gaps

MITHŪN

lloyd crossing

sustainable urban design plan

MITHŪN